THE NEON NEWS

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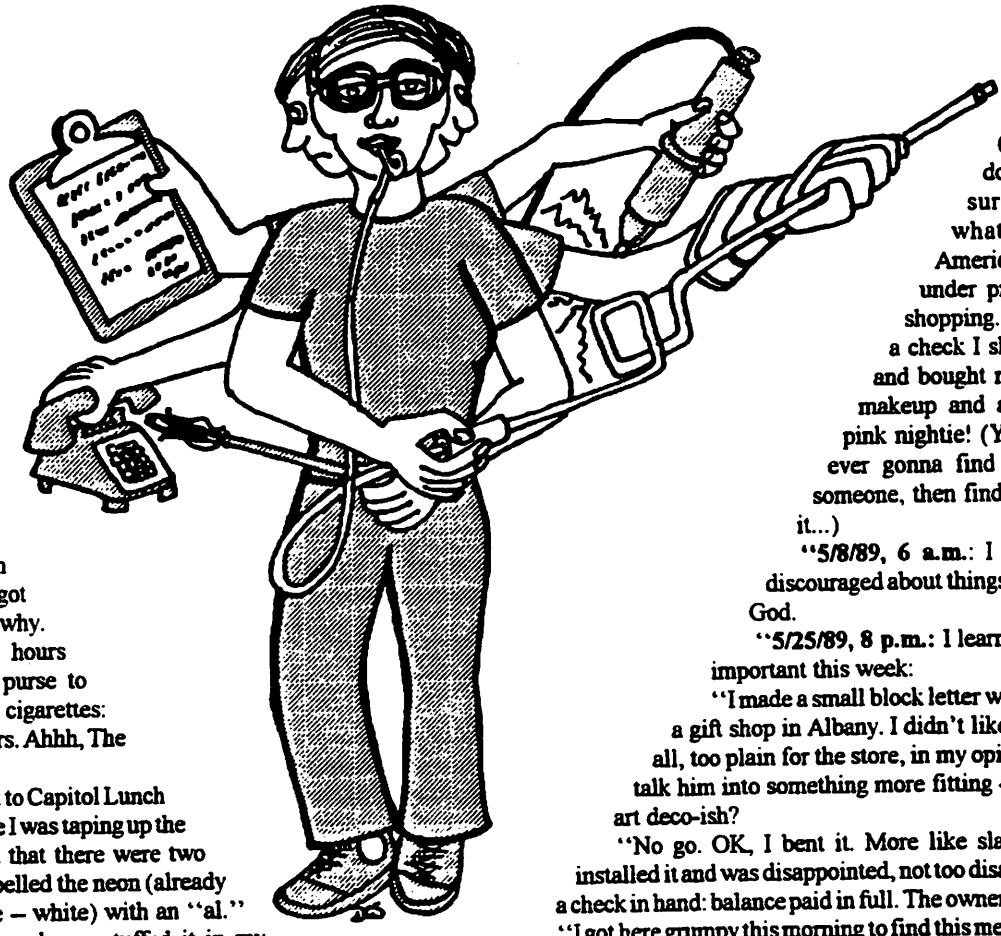
IN THE GLOW IF NOT THE KNOW

NUMBER 13/14 **SPRING / SUMMER 1993**

The hard way: Looking back at self-employment



***<Editors' note:** Long-time contributor Nancy Hannmann has sung the one-man-shop blues for years, and now that she's had a stretch of working for other people we asked her to weigh the pros and cons. To support her conviction that benders need to get together, she takes a hard look back at self-employment:>*

By Nancy Hannmann

"**9/23/86, 3:25 a.m.**: It's too damn early to be starting my day already. I got up at 1:45 a.m. and had to wonder why. Cripes, I'm SO tired: I worked 15 hours yesterday... I just dug through my purse to scrape together enough money for cigarettes: paid for with 15 dimes and two quarters. Ahhh, The Good Life!

"**10/7/87, 9 a.m.**: Yesterday I went to Capitol Lunch to do some measuring and such. While I was taping up the pattern for housing holes, I realized that there were two different spellings for "capitol." I spelled the neon (already bent and blocked out in – what else – white) with an "al." ****. I nonchalantly took the pattern down, stuffed it in my toolbox and split. I called the architect to check on the spelling; fortunately it's HIS mistake, but unfortunately, I have to fix it – fast!

"**11/10/89, 8:30 p.m.**: Yesterday was a real ******* winner. Started out all right, but a persistent negative cloud hung over me all day. By 4 p.m. I was swearin' and kickin' my metal filing cabinet. I figured it out: pressure. Nonstop. Money (or lack of it) pressure, bending (or can't do it right) pressure, deadline (no, it ain't done yet) pressure. So I did what all good American women do under pressure: went shopping. Yup – cashed a check I shouldn't have and bought new sneakers, makeup and a pretty little pink nightie! (Yeah, like I'm ever gonna find time to find someone, then find time to wear it...)

"**5/8/89, 6 a.m.**: I don't feel so discouraged about things today. Thank God.

"**5/25/89, 8 p.m.**: I learned something important this week:

"I made a small block letter window sign for a gift shop in Albany. I didn't like the design at all, too plain for the store, in my opinion. I tried to talk him into something more fitting – maybe more art deco-ish?

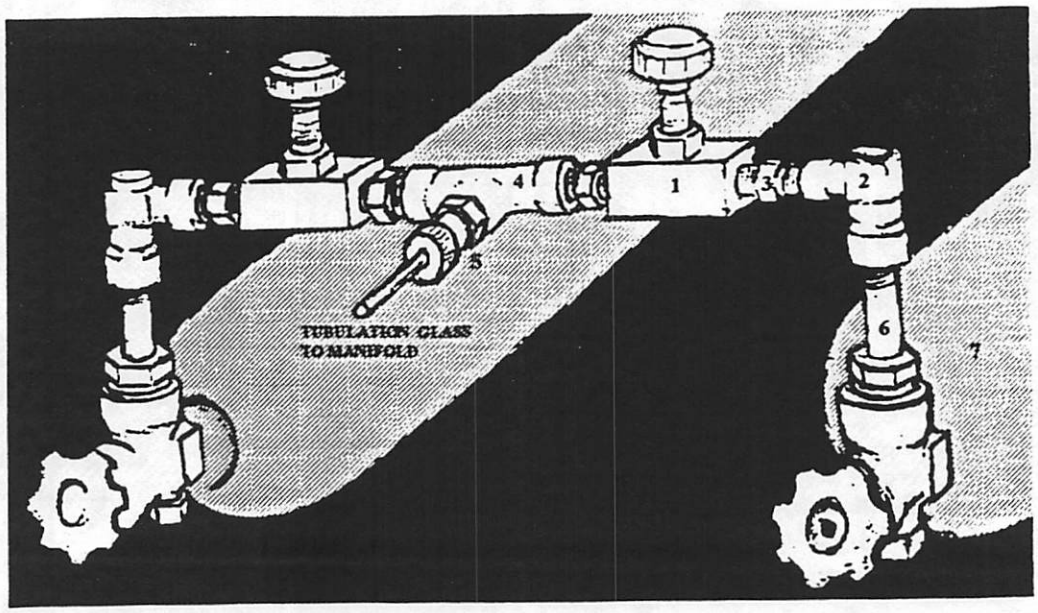
"No go. OK, I bent it. More like slapped it out. I installed it and was disappointed, not too disappointed with a check in hand: balance paid in full. The owner was not there.

"I got here grumpy this morning to find this message: 'Nancy, this is *<the owner>*.' I immediately thought, Oh no. He continued, 'I absolutely LOVE my sign! It looks wonderful! You've gotta see it at night! It's perfect!' and he hung up.

"Well, cut off my legs and call me Shorty. I'd have bet anything he called to complain. See how much I know. Everyone's taste is different and

(see Boss, page 8)

It's a gas transfer system



From **David Ablon** at TecnoLux comes this drawing of a very simple and cheap but rugged gas transfer system that he's been using for ten years:

#1: Robbins "Series INS" valves (good to 3,500 psi / $1x10^{-5}$torr), approx. $110 each in stainless steel (available also in brass and with various configurations of pipe thread). Alta-Robbins' new address: 110 South 200 West, Lindon, UT 84042; (801) 785-1114.

#2-#5: Cajon Ultra-torr fittings (Check your local directory for state name + "Valve and Fitting Co.", i.e. "Hawaii Valve and Fitting Co.," or contact Cajon Company, 9760 Shepard Road, Macedonia OH 44056): **#2:** elbow: -4-E; **#3:** hex nipple: -4-HN; **#4:** tee: -4-T; **#5:** Cajon #SS-4-UT-1-4.

#6-#7: Spectra Gases Inc.: 277 Coit St., Irvington NJ 07111; (201) 372-2060; (800) 932-0264; Fax: (201) 372-8551. **#6:** Adaptor, CGA 580 to 1/4" NPT; **#7:** 100-liter tanks, approx. $150 ea.; 20-liter tanks, $85 ea.; discounts on two or more tanks; no deposit on tanks.

WARNING: Keep in mind that with a setup like this there's a possibility of overpressuring (blowing up) your manifold, because there's no regulator on the gas bottles, such as fancier systems have.

David said that in ten years of use there was only one person who made the mistake of opening the valve too far, allowing, you might say, a bit too much gas into the system, yet he was able to both turn off the valve with one hand and catch the airborne stopcock plug with the other.

Thus we entrust this information to you with a disclaimer: Neither The Neon News nor David Ablon can be held responsible for problems resulting from a system like this.

*<**Also from Ted**: For excellent high-vacuum connections on pipe threads, the kind where your whole shut-down-under-vacuum system will only leak/degas to the tune of one torr in three days, check out Duniway Stockroom's epoxy patch #EP-8034, a generic equivalent of Varian's Torr-seal. This is a two-part high-vacuum white epoxy that dries to rock-hardness, and is only $17 for a goodly supply. I know, we've reviewed it before, but there've been times when I owe my life to it. Duniway can be reached at 800-446-8811; fax: 415-965-0764.>* ◆

Dear neonites,

NESA was an education, the party was a blast, Vegas was neon overload, and we were fried by the end of it all. After two months back home, we're still picking up the pieces (ailing computer, lots of neon work, morning sickness, etc.). So we're late again; sorry. But we hope this monster in your hands feeds your habit for a few months, because it's a true double issue -- more than twice our usual size -- and will do double duty for the spring and summer issues on your subscriptions.

If you missed the May Day Melee, you missed over 200 bending folks, five hours of in-the-fire demos and strange creations, good food, neon videos, awesome displays by Michael Flechtner, inaudible announcements, door prizes, and gracious hospitality by Ad Art and Signs of the Times (and us).

The party was intended to help spark a Letterheads-type benders' organization, which we support wholeheartedly. There will be another neon party at NESA next year, as well as nightly benders' bar sessions like the gossip-packed hours at the Benihana this time around.

But although NESA stuffed our files and address books, we still have 140 T-shirts we had hoped to sell there. So if you want classy NN shirts, send $12 (includes mailing) for everyone on your Christmas list. We have white and colors in large and extra-large sizes; also kid-size shirts for your little ones, so they can brag about your glamorous job...

We are lucky to have many new writers this issue; we also welcome back Mark Snyder, Michael Blazek, and Nancy Hannmann. Thanks also to Nancy for this issue's subtitle, to Tod Swormstedt and Mark Cherveny for the old equipment ads which we've reprinted, and especially to David Copman-Sebesta for the cartoons.

Keep on writing,

– Val + Ted

The Neon News is published quarterly by Val Crawford and Ted Pirsig. P.O. Box 668, Volcano, Hawaii, 96785 USA; (808) 967-7648. Subscriptions are $16 per year U.S., $18 per year Canada, and $20 per year foreign subscribers, payable in U.S. currency only. Single and back issues are $4 each ($6 for this double issue) plus $2 per order for postage and handling. No advertising is accepted, except for classifieds, available to subscribers only at $.50 per word. The Neon News welcomes stories, artwork, photographs, letters, ideas, suggestions and irate comments. The newsletter is intended to be a forum where neon folks can exchange ideas and information.

Better red than dead: A debate on dimming

The NESA neon seminars consisted of presentations by Signs of the Times columnist Wayne Straatman, David Ablon of TecnoLux, Frank Vodoklys of EGL, and Larry Bourque of Voltarc; they were moderated by Henry Brown of Transco. The Q&A session on the second day yielded this discussion of dimming in uncoated ruby-red glass:

Question: What does each manufacturer recommend with regards to uncoated ruby red, what are the problems with it, and what can be done about these problems?

Ablon: It's an excellent question. We've done a lot of research at TecnoLux about this problem; what we actually do is cut up the tubing and analyze exactly what is in there, what's causing that darkening. Actually, visually it's darkening, but in reality it's carbon dioxide that's coming off the soda glass <creating blue light, which the red glass won't transmit>. And it's interesting also because it seems that coated tubing doesn't have this problem and uncoated tubing does. One of the reasons for that is that the plasma stream is not coming in contact with the glass when the tubing is coated. What essentially is happening is that the plasma stream is rebombarding the tubing slightly, and it's releasing carbon dioxide. I've always seen it age in; sometimes it can take up to a week or two, which is very problematic for a sign manufacturer who's trying to get paid, telling his customer to wait two weeks and it'll be okay.

There are ways around it. Originally, people were pumping it normally; when it cooled down to 100 degrees C, filling it with neon <to rebombard it>. I'll say that's the way it was done, and it works. But neon isn't resistant enough to really get the glass hot a second time through bombarding. So I would recommend helium in the tube; fill it with two to four millimeters of helium, and bombard it a second time. It's important not to get the electrodes hot a second time, though, you really want to heat <just> your tube. There's been some research with a helium-hydrogen mix that would allow you to get a very hot tube very quickly. It just needs more time to outgas, is the bottom line.

Larry Bourque: I think David pretty much hit the nail on the head. It is happening <problems with ruby red>, whether it <the cause> is the carbon dioxide or another chemical. You know, when they go to make this colored glass they add different chemicals, and whether it's carbon dioxide, borate or something <else> coming out, it is poisoning the tubes. We're not really sure at this point how we're going to solve that problem, although we are working on it.

We used to think that if you got the tube hot enough, that would solve the problem. And basically up until a while ago, that worked very effectively, because people would send back tubes that were uncoated ruby red that were dimming, and we would reprocess that tubing and make sure that we got the glass as hot as we physically could, and also that unused sticks that they sent back we would do the same thing. And that seemed to work, until we ran into some tubes that, <even though> we got them so hot that you couldn't get them any hotter, the phenomenon still occurred.

As one of the other panelists said, you normally don't see that <dimming> when you have a phosphor on the tubes, on coated ruby red for instance. So we're looking at what kind of barrier can we put on the tubes to prevent that dimming, but at the same time not detract from the color we want.

Henry Brown: Well, I'm gonna be the fly in the ointment. I'm going to disagree... Our position is that we're not really sure what it <the cause of dimming> is either. Now we've tried everything: we've tried helium flushing, we've tried heating it until we bring the glass to the melting point, we've tried bringing it to ridiculously low temperature levels.

The only thing that we have found at this point that I can say, in cases where people have actually bent our tubing and now they can't process it... I can give you a formula. This seems to work:

You're going to have to wash the tubing out... <with> a solution of two parts water and one part ammonia. Preferably soak it if you can; if you can find a large enough tray, soak it in the solution, <then> stand it on end and let it completely dry, because if you don't get it dry you're only adding to the water vapor content...

When you process it, do not, if you can, process it at more than 200 degrees celsius; we've actually found that we had better results if we did not overheat it <once washed>. For some reason, the heating seems to bring back out what you're trying to wash out. And so we found that actually by not overheating it this seems to work – I'm going to give it, so far, about a 90-percent-plus rating.

Even with that formula, however, if you have 25 tubes to do, you may have to repump as many as five of the 25 lamps a second time. So we recommend that you only use ceramic-collar electrodes, because you need to be prepared for the extra bombardment if necessary.

Question: And why is it that when Corning made the glass we never had this problem?

Brown: Ah, I was ready for you! Let me give you an anecdotal experience within the last six months that says "sorry, you're wrong." This company that is in the eastern part of the United States went... and bought a truckload of ruby red glass, and they thought the glass had to be twenty-five, thirty years old. They bent it all up, assumed it was Corning ruby red glass, and they weren't going to have any problem.

I should add one last recommendation, which is: from a pumping standpoint, if you can, keep the units six feet or under. The longer you make the unit, ... the more difficult it is, and you can almost expect to double-pump it.

Going back <to the example>, they were the ones who called us up and said, "Oh boy, we've got a real problem here." They had, at that time, over 50 units already bent up, almost all of them over six feet long. And they kept pumping them, and pumping them, and pumping them, and couldn't get 'em out.

They took each unit and cut the electrodes off, washed it with the formula I just gave you, put electrodes back on – I think they had, out of fifty-some units to repump, about half a dozen units <that still failed>.

So I know it works, and that's where we started with this thing, and we've had two or three other companies that have had similar experiences use the same formula and the result has been the same. So I have to say respectfully that's not true <that old glass is better>.

Question: If the ruby tubing is causing problems like this, why are you marketing it? And since you are marketing it, why aren't there instructions for processing it <to minimize these problems>? I personally had a very large job this winter – a nightmare – and I tried all your tubing and eventually had to use clear glass, and I was told that I couldn't return the tubing, and I couldn't get any credit for it.

(see Ruby, page 27)

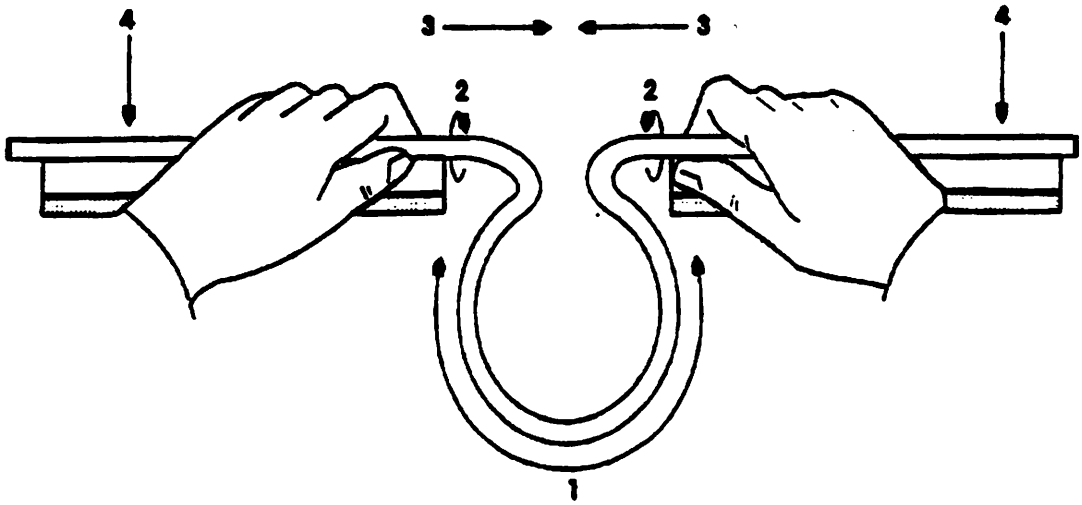
Move over, Miller: New textbook finally arrives

By Ted Pirsig

Time was when about the only substantial information on neon was Sam Miller's Neon Techniques and Handling and Signs of the Times. (Thus The Neon News was born.) Now there's plenty more (thank god), but only the recently published Neon Principles: The Art of Shaping Light with Neon (with its companion workbook) by Randall L. Caba finally shoulders aside the Miller text in the if-you-have-only-one-book-it-should-be-this-one category.

There's a lot of good stuff in here. I like Caba's matter-of-fact approach to what it takes to be a bender: "With... hard work and lots of patience even you can become a neon glass bender. Just be prepared to learn a few things about yourself along the way." Also, "If you tend to be a perfectionist, give it a rest."

Inevitably this book faces comparison with Miller's book. While that book is stronger in theory, this is a hands-on text, concerned with minute details of glassworking rather than the scientific aspects of glass and electricity. Thus they really are complimentary.



The information here concerning equipment does cover all bases, but only in generic, familiarizing terms. So the readers most likely to benefit from Caba's text are newcomers to neon, who will appreciate the focus on glass technique and an overview of the field.

Caba also does an admirable job of hitting the most important contested technical issues without getting mired in controversy, with statements like, "Most agree that a vacuum of at least 5 microns is acceptable and will contribute to a long lived tube," and, "Usually neon units of eight to ten feet are acceptable. Many shops surpass this limit by six to ten feet regularly. Some even achieve welcome results, many do not."

There's choice stuff for neon veterans too: tidbits like how to bend a small "split O" in one heat, and a clever way of adding just the slightest amount of mercury vapor without rolling a ball of mercury in, for sculptural neon-gas applications *<see illustrations>*.

Another feature that will earn this book a place in my shop, not on some remote bookshelf, is the excellent technical charts, including tables on tube legibility, feet of tubing per letter, tubes per pound of glass, pricing, conversion factors, filling pressures, transformer data, and inert gas characteristics.

I admire any efforts to standardize and upgrade quality in the neon industry, and Caba's book contributes to this in several ways. In one section he defines various bending styles, with terms like "beer sign bending" (all visible parts of the tube on one plane, dip-tank style); "Cadillac letters" (no visible welds) and "commercial letters." Caba tactfully defines the latter as "a bend-as-you-please style with few guidelines available. In fact, many times this kind of bending is difficult to read up close but works well in signs displayed at a distance from the viewer." (Hmm, remember Audie Foote's "tweebie" column?)

One intriguing chart at the book's end is a "Tubebender Ability Qualification Table," with well-defined categories such as minutes-per-bend, number of variations from the pattern, number of marginally acceptable bends and so on, with guidelines for using the chart as a measure of professional skill.

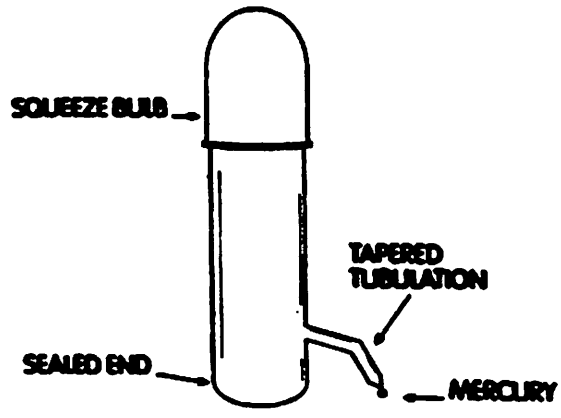
The book has some shortcomings. Health issues get short shrift: nothing on ventilating a shop, no mention that a bombarder can electrocute you (just a general warning about flashback), nothing about asbestos in older shops (or modern alternatives to it), and next to nothing about mercury hazards.

In addition, there are some pesky little problems. Some of the glass techniques would benefit from more illustrations. Some of the prose is awkward: "This can minimize the amount of needless turning or flipping of the hot glass on the way to the table saving many bends form distorting motions." I get the meaning, but...

Also, I could do without the full-scale letter patterns; the is the age of copy machines that enlarge and reduce, after all, and the 18 workbook pages devoted to these feel like filler.

All in all, however, this is an excellent pair of books, and a great contribution to the craft of neon. I'm only sorry I didn't see them sooner.

<Both books may be purchased directly from The Neon Press, P.O. Box 213, Gresham, OR 97030. The price is $39.95 + $3 shipping and handling for Neon Principles; the Workbook is $17.95, and shipping and handling for both is $3.50. They come with a 15-day money-back guarantee, and are also available from Signs of the Times.> ♦



Driving neon around the bend

By Michael Blazek

When I was under my apprenticeship at Claude Neon in Auckland, New Zealand, a situation occurred that continues to be one of the most comical I've come across in the industry.

I was working under a journeyman glassbender; I'll call him Wayne. When we had a problem with 9mm argon tubes going dim at one end, Wayne was asked by the management what the probable cause might be. At the time we had a roughing pump and mercury diffusion pump (water-cooled) combination with a glass-stopcock handmade manifold.

Wayne told the immediate management that the problem was the pumping apparatus, and the only way to alleviate the problem was to order a new-fangled complete pumpstand from abroad. This was not entirely the case, but Wayne felt that his superiors knew little or nothing about neon and figured the new pump would be great to work with.

The recommendation went up the long chain of command, and two months or so later Wayne was brought in to help decide which unit and accessories were needed.

About two months after that, a crate arrived from the port amid a buzz of excitement and anticipation. The pump was carefully unloaded and installed to Wayne's specifications. (He insisted the new pump was so dangerous to work around that a wooden fence should be built all the way around it to keep nosy punters from being electrocuted. He had a hard time keeping from laughing as the carpenters began building the retaining fence.) When the pump was assembled and plugged in, we tested a few tubes to see if everything was in running order.

The pumpstand itself looked like a video game. It had a free-standing metal cabinet with a steering wheel that operated the choke (turning it to the right brought the slide out of the block, increasing the amperage; turning it back to the left returned it into the block) and a safety glass "windshield" to protect the operator from the wires and tubes. Wayne requested and got a new swivel chair that was height-adjustable, and we each took turns taking the unit for a "spin around the block".

We noticed upon filling some test tubes with neon that not the entire tube came up a nice red color straight away. The far ends were pinkish white and took about five minutes to burn in to bright red. Wayne had suggested at the time that we could speed this process up by leaving the bombarder engaged for thirty seconds to a minute when checking for color after filling with the gas. He explained that the pump bombarder could be run at higher amperage than the aging-in transformers. In doing this, over the period of a minute with the bombarder engaged the bright red glow gradually grew to the far end of the tubes.

The next day the glassroom management arranged for a demonstration in front of the higher ranks of management, to see how the new pump worked and to justify the staggering expense.

Wayne was at his best behind the pump, complete with safety goggles (the only time he ever wore them). We stood behind him – the roadcrew, as it were. And the management team stood off to the side, behind the safety barrier. Wayne's immediate boss instructed him to show everyone how the pump worked.

Wayne then attached two 15mm curved, clear letters and began pumping, explaining what was happening as he went. It must have seemed a complete hocus-pocus show for the management team; they knew little about the physical requirements of bombarding and glassbending. One industrious production manager asked Wayne what the steering wheel was for. He explained, "It is for driving the neon around the bends. When these tubes cool off to fifty degrees centigrade, I will show you."

Well, the magic moment arrived: Wayne closed off the manifold after checking for no light emission and siphoned 5-6 mbars of neon gas into the manifold. Then he turned the bombarder on: about half of each tube glowed bright red and the rest of the tube was the characteristic pinkish-white. As the heat from the amperage of the bombarder discharge heated up the electrodes, the red glow gradually advanced around the curved sections of glass toward the far electrodes.

Wayne grabbed the steering wheel and began manipulating it this way and that, mimicking the snaking path of the expanding red glow. As the glow reached the end of the tube, he cut the bombarder switch and all the managers nodded their heads.

"We didn't have this steering wheel on the old pump, so we couldn't drive the gas to the end of each tube," he explained, "and that is why they were going dull."

Well, that certainly was good news to the white-collar brigade, and they retired to their comfortable offices, content that another problem was solved.

<Editors' note: On reading this, Peter Mason of Masonlite sighed, "I see we'll have to modify our instructions on the use of those."> ♦

A lethal legal lesson for signmakers

By Val Crawford

What's your worst sign nightmare? Come on, pull out the stops.

You fall off a ladder and croak? No problem, you're gone before you know it. Let's imagine some real lasting agony...

How about if a sign that you didn't make, and that you serviced only once, falls and kills somebody, and you're found liable for a million dollars?

It happened. Not to you, but don't relax too much. How carefully do you read the contracts you sign? How much do you know about your legal rights and responsibilities after you sell a sign? What does your business insurance cover, and how much do you know about the insurance of the contractors and business owners you work with?

Getting nervous yet?

The best presentation I saw at NESA was a guided tour of the legal minefield facing signmakers, presented by Young Electric Sign Company's lawyer, Neil Smith.

He started with that worst-case scenario, which unfortunately was true: an 800-pound electric sign fell and killed a customer leaving a retail store. Smith then went into the details of the case, from the gory to the subtle – even to the point of YESCO hiring a meteorologist to establish the wind speed and direction on the dates years back when the sign was serviced.

The outcome: even though the company was not the guilty party in terms of the sign's design and installation (another company, long out of business, had done the original work), when $1 million was awarded, YESCO had to pay.

Hence, said Smith, there are several lessons to be learned:

Insurance: "Beware of terms that require you to indemnify, hold harmless, or purchase insurance for the benefit of the other party" in a contract. The service contract YESCO signed required $1 million in insurance; that was the amount the court saw fit to award.

Even small contracts and subcontracting agreements can be legal nightmares this way; Smith said to make the other party SHOW you a certificate of insurance; don't take their word for it. Otherwise, if you are the only insured party involved in a troublesome job, you may be the one to pay, whether or not you are at fault.

Contracts: In fact, he said, beware of contracts in general, because usually even so-called "standard contracts" are heavily weighted against the sign company. Make sure that contracts you sign limit your liability thus: "Seller is responsible for damages resulting only from negligence and/or intentional acts of Seller's employees and its subcontractors." <*See page 25 for some particularly dangerous contract terms.*>

Maintenance: In terms of maintenance, particularly of signs which you did not install (and therefore don't know all the details about), use "common sense and prudence." Keep detailed records, and if you see a problem with a sign that you cannot correct without the owner's permission and/or extra cost (say, rewiring), immediately send the owner a letter noting the sign's deficiencies and giving a price for you to correct them. This way, the problem is clearly the owner's responsibility to correct.

If anyone else touches the sign and there's a problem later on, things get very complicated indeed. In the case discussed, the store's door was relocated to under the sign, and the sign was taken down and reinstalled by non-sign painting contractors – who allegedly hung the 800-pound sign from quarter-inch ply (not 2x4 studs) by only four 3" screws. Then YESCO serviced the sign for some minor problem, never getting behind it or seeing what it was attached to, thus never suspecting a problem.

But YESCO was still found liable, since no one was able to document what the painting contractors had done or when. The moral, according to Smith, is: "Beware the incomplete, inexpensive, inexplicably simple sign repair." Just say no to these, particularly if you smell the faintest whiff of trouble. If you do go in to, say, replace a transformer or tube on a sign that you then see is badly wired, get the owner to sign a statement to the effect that they were offered a more complete overhaul or servicing.

Other contracts: The "prime contract" between the property owner and the general contractor poses other problems for subcontractors. An otherwise harmless contract that adds six fatal words, "unless the prime contract documents otherwise provide," holds you to every word of the hundreds of pages in the master contract, which in most cases subcontractors don't even see. There are other ways of wording this provision, but they all invoke other contracts and documents. WATCH FOR THIS! If you can't get rid of such terms, make sure you review the whole prime contract and other documents carefully; this is your right, since you're bound by them.

Getting paid: On the matter of trying to collect payment for signs which have been completed but not paid for, Smith waved away our cherished belief that we can march in and repossess signs. Apparently, according to the "uniform commercial code" that underlies U.S. business law, when you deliver a product, the legal title to that product passes to the buyer – unless your contract delays that transfer of ownership until the sign is paid for.

He had another horror story to drive this point home: YESCO did millions of dollars in signage for the 1984 World's Fair in New Orleans. The contract specified that payment would be made in three installments: before, during and after the fair. Only "before" was ever paid, but the company couldn't march in and take down the signs; it had no stronger claim to payment than any of the many other burned creditors the fair left behind.

Now YESCO's "house contract" provides for a security agreement and financing statement allowing removal of the signage if payment is not made. This is not an effortless process, as it involves the timely filing of detailed "UCC-1" documents, but it will protect you like a "deed of trust" or mortgage agreement does in the real estate world. Consider pursuing this for big jobs, and if you've been burned, you might want to research it for regular use.

Also, avoid "lien waivers," since they weaken considerably your ability to demand payment. Instead, Smith provided a page-long example of a simple notarized "waiver and release notice" which protects both sides (I'll reprint it in a future issue if I get any requests), and this nifty short security agreement which protects the sign seller:

"Seller retains and/or is hereby granted a security interest in and to all items of property (ie: the sign(s), and associated components, parts and equipment) delivered by it pursuant to this agreement, which items are described elsewhere herein. This security interest is meant to secure the payment obligation of customer in the total amount of $_____, upon terms as set forth elsewhere in this agreement. Customer hereby agrees to promptly execute and deliver to Seller such UCC-1 forms as it may reasonably require."

And stipulate in your contract that collection fees and attorneys' fees are the customer's responsibility in the event of non-payment.

*<**Editors' note:** Mr. Smith not only graciously allowed us to print some of his presentation, but also gave us permission to fax him short questions. Naturally, we won't abuse this wonderful resource by pestering him for legal advice in current cases, but we will forward to him our readers' experiences and concerns. Send 'em in – we've got an expert on our side now!>* ♦

(see related story, page 25)

NESA neon nuggets mined from Vegas glitz

The sign orgy in Las Vegas rewarded our big ears and long hours with a thousand stories. It was impossible to truly "cover" a show that had over 10,000 sign people, 600 exhibits and 35 seminars. (And we didn't even catch the Elvis-impersonating skydivers in sequined jumpsuits, the Terry Bradshaw boytalk, or the "spouse/guest" tour to the Liberace museum.)

For us, the three rings of this circus were the seminars, the trade show floor, and the informal gatherings of benders at the kitschy Benihana bar, where we hung out and watched the singing puppets and artificial thunderstorms with a few dozen neon folks. (Thus most of the following tidbits didn't come to us on paper; if we misquote, let us know and we'll correct in the next issue.)

People and places

When we met Maureen Harvey of Studio One Neon (Santa Fe NM), she mentioned that she was concerned about neon and health issues, particularly reproductive health. She said the most common problem she sees in shops is lack of adequate ventilation, and she strongly urged that at least some vents be at ceiling level. She was well-informed about this stuff; we challenged her to write a tubebender's health-food cookbook, based on her finding that **applesauce and beans** (both high in pectin) are the most effective foods for pulling heavy metals out of the body...

William Paisley of Phoenix AZ is also concerned about health issues, especially electromagnetic fields (EMFs) and mercury (he NEVER repumps mercury tubes). He had lots of stories about how his **one-man shop handles big jobs**; a neon-heavy 14-plex theater complex, for instance. His motto uses a favorite anatomical analogy: "It's not how big it is, but what you do with it." We hope he'll write more about this – the neon, that is.

Jim Nourse and Newt Grover were also from Phoenix, and had a few tricks to share. Newt said he uses **straight neon on mercury tubes** and gets no snaking, although some customers complain about the pink color when they first light up the sign.

All three Phoenecians complained there are too damn many neon shops there. They said their pet peeve is the low-buck amateurs whose business cards read "Lawn service, odd jobs, neon signs..." (Others moaned about cutthroat competition in the Vancouver and Minneapolis areas...)

David Ablon of Tecnolux had somewhat similar things to say about the New York City neon scene – he said there are no fewer than **fifty brand-new neon shops**, most of them with foreign-trained benders; he mentioned Russians, Chinese, Koreans and Israelis as being among the new neon crowd.

When we pressed him to comment on any technical or quality differences between old (particularly unionized) and new shops, he tactfully allowed only that the union shops tended to be more "consistent" in their installation techniques. *<We'd like to hear more about life and technical norms in union shops, if anyone has insight into this.>*

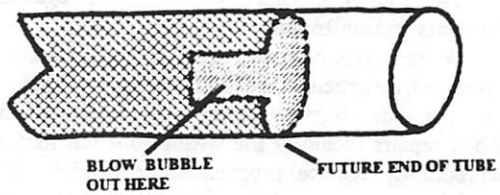
David's technical insights could fill pages; you'll see his advice on ruby red glass and gas transfer systems elsewhere in this issue, but some short takes are:

– **Make silicone grommets** to hold neon securely in freestanding bases; they don't deteriorate from ozone. Find a good rubber supply store and get half-inch-thick silicone sheets, then just punch the rings out with grommet tools.

– **On staining**: he's convinced it's often due to water in the tube...

– **Cold-cathode technique** (shown with slides at one of the seminars):

1. Pull the phosphor out of the end of the tube in such a configuration:



Use what is now the end of the coating as a guide to where the tube end will be (this makes for very accurate tube lengths). The extra swath of powder removed is for where the bubble will be blown out, on the back side.

2. Heat the end glass in a cannon torch and pull out the glass with tweezers and square it off.

3. Blow but don't pop the side bubble – pull it out with tweezers instead.

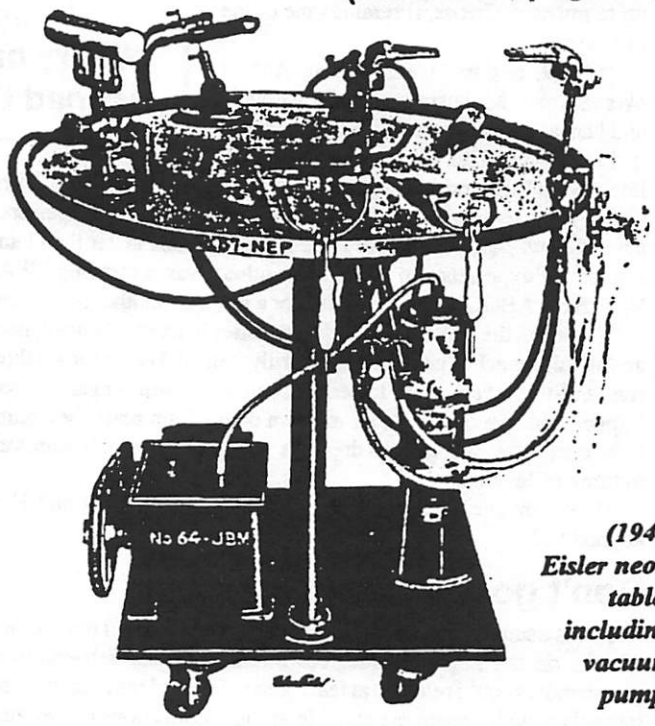
4. Weld the electrode on with a handtorch and anneal for 60-90 seconds (or set up a jig over a ribbon burner with a soft flame, for high-speed production.)

When using 8-foot cold-cathode blanks use a V-shaped roller to hold the far end.

– **Capping cold-cathode**: use EGL 19mm brass caps and cap cement mixed with alcohol. Put a quarter-teaspoon or so inside the cap, rolled up into a ball; poke the wires through this and twist. Put it in a soft flame to heat the cement until small yellow flames shoot out through the holes. At this point, while the cap is hot, push rosin-core solder over the whole cap and snip off the lead wires (dipping in a pot of molten solder is the norm; this is his shortcut).

David and Jim Nourse both raved about a method of **bending without a blowhose**, using a jet of air diverted from the blower; they said Meg Wentzel at the New York Experimental Glass Workshop

(see NESA, page 20)



(1948 Eisler neon table, including vacuum pump)

Ideas, writers sought for sign restoration book

Neon sign restoration demands more technical skills and background knowledge about signmaking than any other kind of neon work – but there is no master reference about materials, techniques, or historic preservation considerations.

That's going to change. We are putting together a guidebook to neon restoration, with contributions from all different kinds of experts and craftsmen.

We need your help: as writers and photographers, tipsters and advisers. We need case studies of vintage signs you've repaired or restored. In particular, we need nitty-gritty technical details, preferably also the always-entertaining stories of difficult "jobs from hell" that didn't turn out quite the way you bid them (we'll keep you anonymous if you want). We need horror stories of decades of bad repairs (some of the wiring jobs tell long tales), cautionary tales about proper paints, and thoughtful arguments for incorporating technical progress where it rightly belongs.

We have started asking people we know have been involved in restoration work, like Len Davidson of the Neon Museum in Philadelphia, but we need names of other possible sources. They don't have to be "writers" – we do phone interviews and other legwork – but we can't do the book without people who know something about old signs and signmaking in decades past.

Also, we need information about old glass (brands, colors, compatibility with new glass, etc.), old wiring and its optimal adaptation to new standards, and particular kinds of sign painting formerly used with neon (we restored a sign which revealed elaborate pinstriping under many layers of more recent paint). We also would welcome referrals to sheet-metal folks who know about old tank signs. And we'd like some success stories about the businesses and communities that benefit from restored neon, whether as signage, decor or public landmark.

So, give us a call (or fax) and tell us your ideas on making old neon "as good as new" again. If we get a full-color publisher, we will definitely put out a call for photos in the next issue. We hope to have most of the writing done by the end of the year, and maybe unveil the book at NESA next year! ♦

(Boss, from page 1)

no one's idea should be discredited. Wow, a lesson I got paid to learn! God, ya gotta love this business!

"**7/26/89, 4:50 a.m.:** I pulled apart my vacuum pump last Friday to change a gasket that was leaking. Monday I drove about 35 miles each way to a farm supply store that carried the milk hose I needed to connect the pump to the manifold. It turned out to be the wrong size, but I didn't figure that out until I tried to shove it on the vacuum pump intake. In the process I broke the main stopcock, stupidly. Got it fixed, refitted and back together and promptly broke it again. A two-day wait for a new one leaves me with unpumped neon up to my ears. Cripes, it reminds me of the old days.

"**8/1/89, 5 p.m.:** I am starting August overwhelmed. My business is really in trouble and I am at a total loss as to what to do about it. I am always late: late getting work out, late paying bills and late getting paid because I was late in the first place. I am feeling my lack of bending and business experience acutely now... There have got to be ways to do this faster than I am. My lack of experience in bending for others was something I WAS WARNED ABOUT. What I'd give for a week in another neon shop.

"I stood at the sink last night doing dishes in tears. My head, neck and shoulders ached so bad I could hardly stand it. I belted down three rum-and-whatevers, went to bed and couldn't sleep – again... I feel trapped and caged and it's all my own doing. I am really beginning to wonder if this whole neon dream is worth it anymore. It scares me to think of leaving...

"Does anyone else go through this? What did they do? Hey, anybody...?"

There isn't a glassbender I've met who hasn't struggled in this trade. Every one of us has learned the hard way.

Don't go it alone

This is a sampling from my days of self-employment. I realize most of it is on the negative side, but I imagine most self-employed glassbenders could relate to at least some of it. And reading those old journals actually made me chuckle at the recollections (it certainly wasn't funny at the time).

My dad, a self-employed sign man for some 50 years, once wrote in a poem to me:

"So, you think you want to be the Boss?
"To take the profit AND the loss?"

That does sum up self-employment pretty clearly to me. It certainly was a learning experience for me, albeit a very hard one.

So I guess my first bit of advice to those of you anxious to "be your own boss" would be to get yourself some experience and AT LEAST know how to bend and pump glass well. (I myself had a whopping five-and-a-half months of experience when I bought my shop in November 1984.)

I am certainly not saying it can't be done; I did it. But at what cost?

And when you have the choice between doing "good enough" and "best" – pick best. Yet for me, trying to do best-quality work with next-to-no experience meant taking a WEEK to do a five-stroke, four-foot-tall, 15mm "O". Yup, I remember it still. I could hardly look at my bombarder without wanting to grab the leads and step on the pedal. All because I did not know how to cut large-diameter glass off the ribbon. (Believe it or not, I just perfected that handy trick in the last nine months: cut the sucker hot. It doesn't work for everyone, but it's great for me.)

That's what being in seclusion in a one-man shop will do to you. You'll do what works best for you – which usually boils down to you'll do what you know. You hate to waste time and glass by trying something new, but you're wasting time and glass because what you're doing is NOT working. For years, and I mean YEARS, I wasted a lot of time and glass because of my impatience to jump in and own a neon shop...

For a long time I felt like I had wasted the best part of my youth struggling alone and isolated in a solo shop. Compared with all I have learned about bending glass in the last year since leaving my own shop, I often feel like I learned much less over the whole seven years

(see Hannmann, page 23)

Dr. Argon's Mojo Powder (and other tricks)

<Brian Ericsen of Wanaque NJ, alias Dr. Argon, sent us some installer's tips and a personal neon history:>

Originally I was bending acrylic tubing with hot air and filling that with daylight fluorescent paint & making these "sculptures" glow via a black light. I called it "nearly neon." Close but no cigar!

Using a technique that got me heavily involved with the motorcycle industry, I approached a local full-service sign shop... Armed with two coffee regulars, I met with the most gracious owner and offered to be a work-part-time-for-free go-fur. I said I'd sweep, clean bathrooms and generally stay out of people's way if I could hang out in the neon department.

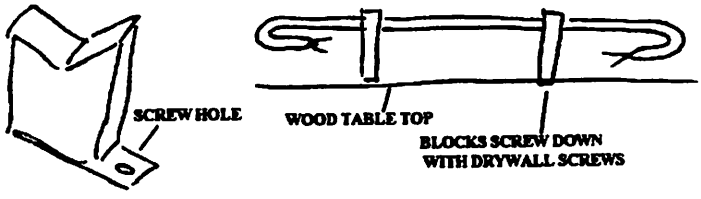
Knowing a good thing when he saw it, the boss said yes, and introduced me to his new tubebender... of course it was Ed DeZuzio. Although I'm twenty years his senior we became fast and close friends. Six months later the sign company offered me money for my services, so I prepared a resume and even wore a suit to my official interview – it's always better to out-dress the boss in these cases...

<Later, when Brian teamed up with Ed in their own business:> We had a great time. One night with Ed on the back of my motorcycle we rode around New York City commenting on neon – what colors looked good and bad together – we became the Neon Police, warning people of dangerous installations (mind you not looking to do the work ourselves, just to save a store owner from a fire) – things like a hanging 15k transformer sitting on carpet, transformer leads made out of light-gauge speaker wire, bare tie-wire jumps, you know the routine. But what was discouraging was that no one cared (even though the speaker wire finally caused an inside-the-wall fire).

We prided ourselves on our installations. My motorcycle racing background was useful in bringing a different technology to our work: Sano wiring, plastic zip-ties, P-clamps, et al, not being happy with the "it's been done this way for 50 years and why change" attitude. (But beware of that cutting-edge stuff: you can bleed.) We would even bring a shop vac to clean up after ourselves – customers always liked that.

These are some field-tested tricks I'd like to share:

Dr. Argon's Mojo Powder: A picnic mustard/ketchup dispenser filled with talcum powder; squirt some into soda (heavy plastic) hose or whatever else you use for GTO covering and you can snake the GTO through without all the gyrations normally associated with that chore.

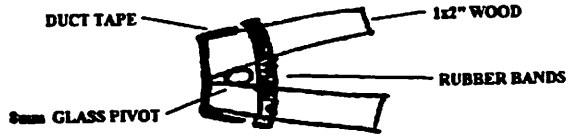


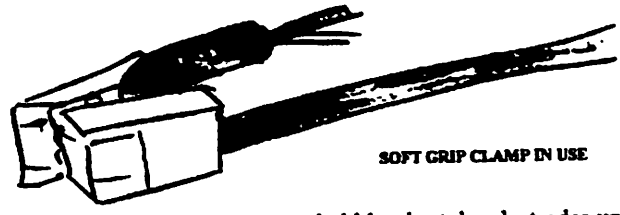
Vee blocks for border tubes: Cut from wood and with feet to allow them to be removed and relocated easily. Will make tube aging and blocking-out of double-backs much easier – you can spin the tubes around while painting them.

For bombing mercury repairs: Cover the units to allow them to get hot enough, because it seems the residual mercury keeps them cool and the electrodes cook before the tube gets hot. This tubes-in-a-blanket technique works well. (Non-asbestos works fine).

Transformer extractor: A piece of wood or metal tubing with loops of cord or strapping tape on the ends, to hook over the high-voltage insulators on outdoor transformers so you don't have to death-grip them with your fingertips down inside a sign through the service door to remove and install a transformer. You know if you

drop the transformer it will surely take out a few glass housings and units on its way to the bottom of the box.

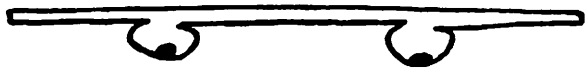




A large soft grip clamp to hold border-tube electrodes up on your bombing table while setting up your tubulation glass. (You can get a sample assortment of plex instead of wood.)

Color-code stopcocks and boreswith paint drops, to avoid mix-up during re-greasing.

Mark neon and argon valves red and blue, to avoid errors.

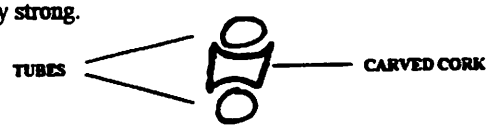


Double mercury traps to save time during production jobs.

Warm up cold & stubborn stopcocks with a hair dryer.

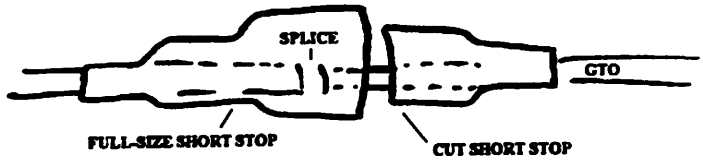
Squeeze blowhose closed before opening the blowhose stopcock to vent the manifold; release it slowly, to help stop the manometer from trying to become "old faithful."

Dental floss instead of tie wire will stop buzzing of adjacent units tied together in neonettes (free-hanging signs, AKA "skeletons"), and it's very strong.



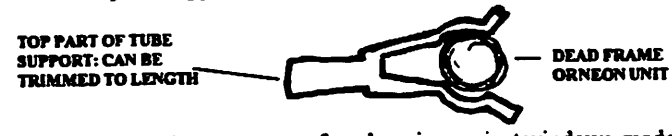
Fish-mouth corks for less slippage on neonettes.

Hot glue instead of electrical/friction tape when tying up dead frames/neonettes.



Two-short-stop splice cover – slide one inside the other.

Crimp-on eyelets for terminals on outdoor-type transformers, instead of just stripping back the GTO.



Bumpers to keep neonettes from banging against windows, made out of plastic tube supports. ◆

Boonstra dissects glass & metal manifolds

By Dick Boonstra

There is a lot of talk concerning the differences between metal and glass manifolds, and I would like to compare the two. First, though, let's look at basic manifold characteristics regardless of material used.

The physical dimensions are of primary importance, especially the inner diameter. The resistance of the gas molecules passing through must be as low as possible, which translates into the conductivity of the manifold needing to be as high as possible. Conductivity is expressed as liters-per-second ($l.s.^{-1}$); pumping speed is expressed as the same value.

The formula for calculating conductivity is:

$$c = 12.1 \frac{d^3}{l} = l.s^{-1}$$

where c = conductivity; d = the inner diameter of the tube in centimeters; l = the length of the tube in centimeters; 12.1 is a constant number; $l.s^{-1}$ is the conductivity as well.

It is nearly impossible to double the effective pumping speed of a given manifold (you'd have to install a pump with gigantic power).

As you can see from the formula, it is mainly the diameter of the tubulation tube that is important, because it is to the third power. The length is less critical, because there is no power factor in it. Yet we cannot ignore the length factor. Keep your manifold as short and with as few curves as possible; this is important because of degassing each time the manifold is brought down from atmospheric pressure.

Often the tubulation will get very long on a system after multiple units have been welded on and not cut back each time – this will give you extra resistance, and therefore less conductivity, resulting in a slower effective pumping speed. Looking at the high-vacuum pumps used in the neon industry, it is not necessary that the overall diameter of the manifold be larger than 30 to 40mm.

Comparing materials

There has been research into the possibility of using plastic for building manifolds; however, problems with degassing and non-resistance to low-pressure mercury discharge ended this research.

The glass manifold has some obvious advantages:

– low cost;

– almost all neon benders are capable of building one, using materials already in the shop;

– as a rule, benders have enough knowledge about vacuum theory to make glass manifolds with a wide enough bore;

– glass is not porous and has a very smooth surface, with a very tight molecular structure, and is therefore not sensitive to oxidation (even mercury oxide will not stick to the inner glass wall);

– there is no chemical reaction with mercury, even after bombarder flashback;

– leaks are very easy to detect with a Tesla coil;

– the state of cleanliness inside the manifold is easy to determine;

– and cleaning glass manifolds is easy.

The heart of the matter, as far as glass manifolds' suitability for quality neon processing, is not the manifold itself, but the amount and type of glass stopcocks necessary. All stopcocks have a certain degree of leakage, so the fewer the better.

Especially with grease-lubricated stopcocks it is difficult to reach the same end vacuum after only a short period of time. This is because of the dirt passing through which collects in the grease, then degasses continually into the system. Combined with the small bore (8mm and 10mm are already considered by many to be a "big" bore), the conductivity of the stopcocks is lower than the pumping speed of the manifold, and they are therefore restricting it. It is better to choose a stopcock with a much bigger bore. These won't give you much advantage during bombarding and electrode activation, but will help you reach a much better end vacuum in a shorter time.

Even smaller stopcocks like 2mm cannot be used for connecting vacuum measuring equipment, because the conductivity is so low that the reading is off. Use at least a 4mm bore for these.

Never heat up mercury traps. Whatever end vacuum you might otherwise reach is destroyed by the outgassing mercury.

It's obvious that a glass manifold is not as strong as a metal one. Leaks from cracks lead to lost production time; therefore, many people prefer metal manifold systems.

Stainless steel and aluminum are the best materials for building a metal manifold system. Copper and brass are also used; these are not recommended, for the reasons described below.

A stainless steel manifold with NW-KF type flanges, produced with skill, will remain vacuum-tight forever. The design must be done by a specialist, and all welds (where possible) must be done on the vacuum-side. TIG welding techniques can do the job perfectly, with a final helium leak-test to guarantee that the system will work forever. Aluminum has a greater degree of outgassing but is still acceptable, as mercury does not amalgamize with it.

Copper and brass are cheap and easy to work with, however, problems develop – if not at first, certainly over time! For one, flux must be used in order to weld these materials, and proper cleanup afterwards is generally not done. But the main problem is that mercury, in combination with copper or brass tubing, will give you micro pipes in a very short time. These capillaries are the reason that you can never reach your ultimate end vacuum. These are known as "virtual leaks," in that they fill with air at atmospheric pressure and when the system pumps down they will not pump out due to their tiny size, at least not in the time needed to pump the neon tube. Sometimes the pipe is in actual contact with atmospheric air, in which case it is a real leak.

Manifold maintenance

Every manifold needs maintenance. Even when pumping only neon tubes, there is contamination from fluorescent powder, binder nitrocellulose and pulverized metal parts blown out of the heated electrode shell. Mercury condensed in the manifold will cause slower and slower pumping speeds, due to it continually vaporizing. The saturated vapor pressure of mercury is 6×10^{-3} mbar (6 micron), and as long as you have a single drop of condensed mercury in your manifold the best vacuum you will get is 6 microns, whatever your gauge is telling you. This doesn't apply if the mercury is in a trap, because then it is out of the molecular flow inside the manifold.

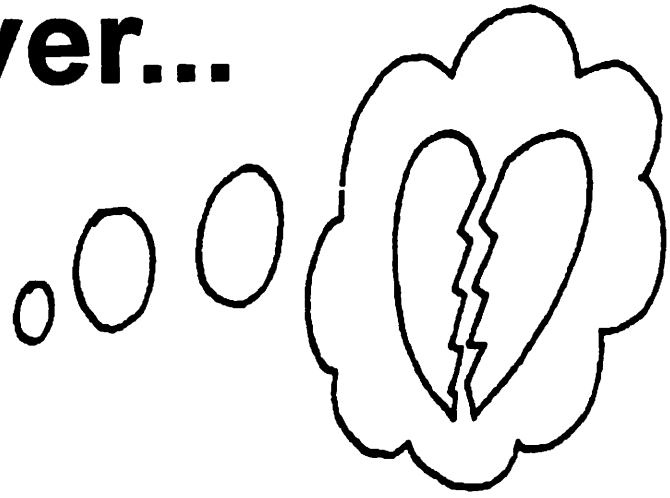
Thus you can see that heating up mercury traps, for whatever reason, is forbidden. Whatever end vacuum you might have otherwise reached is destroyed by the outgassing mercury. Your manifold will soon be contaminated with the condensed mercury, and will only achieve 6 microns no matter how long or what kind of pump is used. Also, it becomes very difficult to produce a red-filled neon tube. The tube never is clear deep red but always orange or a little bluish.

Any vaporized mercury will also be blown into the atmosphere via the outlet of the forepump, polluting the area around the pumpstand. It also, of course, pollutes the pump oil.

In terms of cleaning, a glass manifold has one advantage: the

(see Boonstra, page 18)

Have you ever...



By Nancy Hannmann

<Editors' note: This was inspired by Dr. Argon's "Have you ever..." article in the last NN.>

Have you ever:

...forgotten that hot glass and cold glass are the same color?

...put the wrong end of the blowhose in your mouth?

...gotten lost on your way out of the fire on the way to the pattern?

...wanted to kill the next person who asks you how neon works?

...cried so hard it dripped and busted the piece you were working on?

...spelled a word wrong, and no one noticed for three months?

...told the customer that neon, like a fine silk sweater, is made by hand and therefore naturally has, um, variations?

...had a customer walk in with just the letter "P" and ask you to repair his "OPEN" sign?

...told the customer that your equipment wasn't working right because of the heat, just so you could go swimming?

...run into the same customer the same day at the same pool?

...dropped an entire tied-up window sign?

...gone into your crossfires, and they're not on?

...heard a tiny "tink," then searched your shop wondering what broke?

...made a blatant mistake, with an audience watching, and no one noticed?

...set hot glass in the sweat from your water glass?

...watched a fly fly through the ribbon heat, burn its wings off, then walk and jump around the floor all day?

...had a ceiling tile fall onto all of the 15-foot border tubes you so carefully manipulated through the entire mall during the Christmas season?

...had your father (or mentor) tell you to always install neon top to bottom so you don't drop anything on it, and then he drops the wire snips on it anyway?

...noticed that you hold your breath until the installation's over?

...hooked up a 15,000/30 to a bird feeder, and turned it on when the squirrels came?

...wondered why non-neon people always run their hand, quick-like, through your crossfires?

...heard anyone swear so much?

...smelled burned hair and smiled, knowing it wasn't yours?

...wondered why in god's name you're doing this?

<And some more from Ted:>

...found yourself pulling on doors that won't open, because the letters through the glass spell "PULL" backwards?

...found yourself looking at a word like "PULL" on a door and asking yourself, very slowly, "Is it backwards or forwards?"

...crawled on a pitched roof 23 floors up with your only security an extension cord around your waist?

...looked over the edge?

...worked without a shirt on, then leaned across freshly bombarded straight tubes and put twin burn tracks on your stomach?

...felt so stupid?

...wondered why the newly-changed butyl thylate oil was still degassing, then finally looked reaaaal close and saw a gnat in it?

...known a gnat to degas for four hours?

...said "let's bombard it!" concerning things not intended for bombarding?

...gone ahead and put a sparkler in a tube?

...had to explain the "BOOM!" and smell of fireworks to startled employees?

...found blackened shards in every corner of the shop for months to come?

...lightly touched two pieces of glass together, making THAT SOUND, just to see if your co-workers would look around?

...thought of adding the same sound to the shop music tapes?

...passed off as "black glass" clear tubing with blockout paint sucked up inside? Gotten someone to try bending it?

...gotten five major cuts in one day? After six years of glasswork?

...popped two gas flasks in a row?

...been so mad you bit through the glass mouthpiece on your blowhose?

...swung a full stick of glass samurai-style onto the workbench?

...simultaneously grabbed both hot leads of a 15,000/60 transformer?

...screamed very long, loud and high-pitched, then had to explain it when everyone came running? ♦

Illuminations & hallucinations from Holland

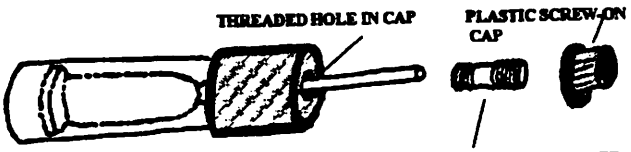
<Editors' note: If it seems like a suspicious number of Neon News contributors go to Amsterdam, there is a connection (who else we gonna call?). Recent emigrant Edward DeZuzio cleverly solves a problem peculiar to the screw-cap electrodes standard in Europe, and shares other technical illuminations:>

By Edward DeZuzio

One of the best tricks I have picked up while working in this new locale is a way to get those pesky little double-ended, threaded brass electrode-to-GTO connector things onto the pre-capped electrodes.

It seems that the manufacturers of these types of electrodes never have difficulties with their screwing. I'm sure there is a perfectly good explanation for the fine threads inside the cap (trode side) and the coarse threads not on the trode side of the cap. I can't help but wonder if the perfectly good explanation is that the designers never tried to screw one of these pesky little numbers together.

So, after trying to heat these gizmos and CRAMMING them into



DOUBLE-THREADED HOLLOW PIECE: FITS OVER SEALED-OFF TUBULATION (COVERING AND PROTECTING IT), THREADING INTO HOLE. (THREADS OFTEN JAM OR STICK, RESULTING IN CRACKED TUBULATIONS DURING ASSEMBLY)

European-style pre-capped tubulated electrode

place without causing the unit itself to "crack up" or the tubulation to form a mutiny from the rest of the system, and after one too many units to repair, I have a solution that seems to work well.

If you look at a self-tapping screw the solution is obvious. To engage in self-tapping science you need no other tools than those already in your shop. Simply use a file, grinder or sanding machine to cut a groove into the pesky little double-ended, threaded brass electrode-to-GTO connector things.

The groove you cut should be done with loud music in the background and perpendicular to the existing fine threads. The tolerance of the perpendicularity should be within 15 degrees. The groove does not need to be to deep: 2-3mm max. Whatever works for you.

SOLUTION: GRIND OR FILE A NICK INTO THREADS (MAKE THEM SELF-TAPPING)

Tuck in your tubes

A blanket could save many bombardiers hours of frustration. What I am referring to is bombarding clear glass to be filled with neon. A few years ago I learned via Eurocom's Tom Fling that clear glass needs to be bombarded to almost 275°C, because most manufacturers do not bake their clear glass as they do coated glass. Yet the extra heat is needed to release the impurities held by the glass.

We all know that some units will not take this type of heat. A 10mm tube does not have the surface area to accept 275°C without giving in on a thinner-than-usual bend. A 18mm tube has too much surface area to get this heat in a reasonable amount of time.

What to do? Well, you could offer your customers 12mm tubes only, or close down and get a new life.

Seriously, what to do? With help from other tubeheads and mad scientists and land-speed-record-holders, I share this solution with you:

Try covering the unit to be pumped with a layer or two of Nonbestos. The reason for covering the unit is the same reason you sleep in a sleeping bag when outside in the wild outdoors. It takes an average of 2.5 minutes longer for a covered unit to cool to 50C from 225/230C. This tells me that the vac pump has more time to do its proper job.

When all else fails, kick the fan

Once I had to fabricate contours for a window and Brian Erixsen (AKA Dr. Argon) had to bombard them. Fifteen feet of glass per unit and the designer wanted them to light too. I hate those requests.

Anyway 15mm x 15 feet is a lot of glass to get hot. You would think in August this would be no problem, as the ambient temp was already 40°C: only 200°C more to go. The units (total of 4) bombed with no trouble, but burned in with lots of trouble. In reality (whatever that is) the units were bombarding themselves again. Asking the units to be pink and happy wasn't working. I hate stubborn glass. That's two things I hated about that job. The third thing to hate was thinking about NOT getting paid because the units were not being pink and happy.

So in trying to avoid the third thing many attempts at bombarding these units were made. To no avail the day ended. All the equipment was turned off, the door was closed and the beers were opened. A sip of beer... a glance at the fan... a sip of beer... a glance at the fan... finish the beer... kick the fan!

Indeed, it was the fan. It becomes clearer... the units were cooling off too quickly, hence their desire to continue bombing themselves while off the manifold!

Tickling for stress relief

...Some weeks ago I was working long hours on a series of signs for a yogurt firm (not to be confused with firm yogurt). The glass was pretty difficult to match to the pattern as the original order had been fabricated in soda glass, and Dutch style to boot. Approximately 2.5" single-stroke copy with serifs and 6" double-stroke copy with serifs. The size and layout seemed non-human and the serifs certainly said "NOT OF THIS PLANET" all over them. How the original was bent is beyond my comprehension. However, a lead glass reproduction was needed, all in 9.5mm...

After too many hours of bending, the bombarding commenced. Nothing unusual: 500 million pieces of mica in each unit and sweaty palms.

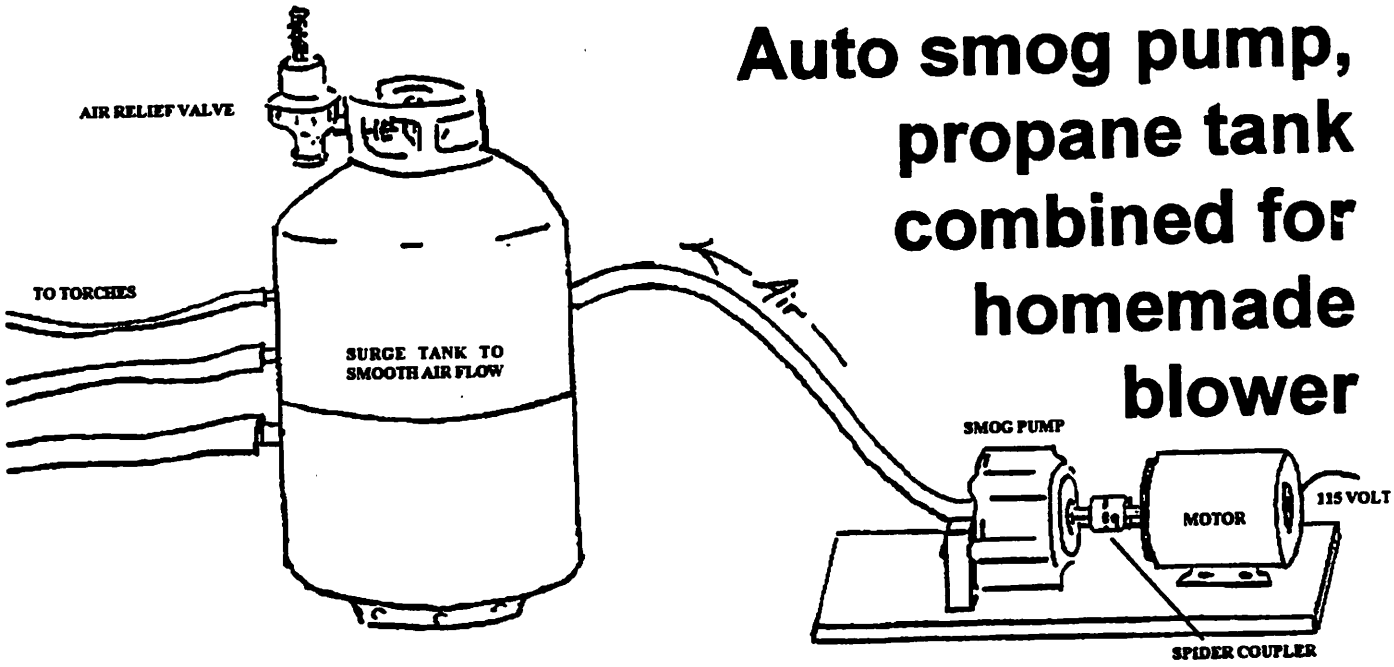
The s.s. copy was okey-dokey, and for the d.s. copy I employed the On My Knees Begging for Mercy Technique of Luminous Tube Processing. (Mr. Miller was familiar with this technique; it's easy to see if you read between the lines.) I lit all the candles and spread the chicken bones on the bombing table. I took one extra precaution and hung cockatiel feathers from the overhead high-voltage trollies. What do you know – it all went well except for the last unit (not surprising, eh?).

I had not noticed that the cockatiel feathers had fallen from their perch until the sound of lazy electricity filled my ears. You know the jive; it is much easier for high voltage to jump 1" of air than it is for it to travel thru a tube with a crack in it. Suddenly thoughts of going home for the day dissipated on the horizon with the sun.

Just then I heard enchanting music. The room filled with a orange-yellow warmth. As I turned I saw the most wonderful apparition, and by her side was a single-flame hand torch (the kind they use in the movies). The flame from the torch danced elegantly in compliment

(see Edward, page 17)

Auto smog pump, propane tank combined for homemade blower



By Terry Schmidt

This drawing shows my version of a blower that usually sells for $600. My cost for building it was $227. This blower supplies a nice steady volume to my 16" ribbon, 5-point crossfire and hand torch.

I first learned of this kind of blower system from a tubebender who owned a (name brand) unit. His auto mechanic friend looked this over and said that it looked like a smog pump from a car, now energized by a 1/3 hp electric motor. Because their surge tank resembled a 20-lb. propane cylinder, I decided I could assemble this stuff myself and maybe save a little cabbage.

The five main components are:

1. A smog pump, of a type installed on vehicles in the '70s. I was told it pumped air into the exhaust system of a vehicle to help "dilute" the emissions from the exhaust pipe. Things get a little vague here because everyone I asked (including a GM technician on a Detroit 800-number service line) had no idea what kind of volume smog pumps put out. So I went to a bone yard and picked up a pump from an early '80s Chevy Citation for $25, and hoped for the best.

2. A 1/3 hp electric motor with 1/2 shaft and 1725 rpm; $90.

3. Lovejoy brand spider connector to link items 1 and 2 (available from Grainger; buy it to fit the shaft size.)

4. Fisher type 289H relief valve, $93. These have four different springs available; get the one rated for 4 to 15 psig. Available from Read Process Control Co., 7565 Corporate Way, Eden Prarie MN 55344; 612-934-5100.

5. BRAND NEW, clean and off the shelf, 20-lb propane cylinder, $15. Because you will weld the steel fittings onto the propane cylinder, NEVER use anything that has ever held gas!

This setup doesn't seem to have much volume left over to operate additional high-volume torches but's it's plenty for my shop.

It's also a bit loud, so putting it around a corner or covering it to absorb some sound helps.

The 1/2" shaft on the smog pump was too short, so a friend machined an adapting part with a longer 1/2" shaft for my set-up.

When adapting from the top of the surge tank to the relief valve, some orifices may need to be drilled wider.

<Editors' note: Terry hails from Today's Neon in Hopkins MN. Some "smog" or "air" pumps have pulleys on them and can be belt-driven (like the one sitting greasy in a box in a remote corner of our shop – it's been kicking around for seven years, awaiting a use such as this.> ◆

Hot helium, clothespins, and other hints

Bob Lind of Goffstown NH has some advice on helium-filled tubes: "Color looks like gold/flesh or nearly like an incandescent bulb, a very warm tone. I pumped a star in a cross shape with no mercury at slightly lower pressure, and it's very bright on a 5kv-10ma transformer. Have had premature burnouts on 12"x15mm clear operating on 30ma. They were installed in a color wheel in the sales area, burning 10-12 hours per day. One tube was pumped slightly lower, the other 50% argon/merc and 50% helium, also less pressure than recommended. Helium burns warmer than argon and we thought it may help mercury tubes in our New England winters. Understand that these experiments were quite random and possibly we should have bought the electrodes required. I have cheated on regular tubes to be installed in the field when my argon or neon flask wouldn't bring the tube up to pressure, and I brought the tube up to proper pressure with 2-3mm of helium. (Yes, I really drag out all the gas I can and have only lost one liter in 45 years during the seal-breaking operation...)"

Other advice: "I have better results with 15mm tubes less than 8 feet long, especially classic colors and mercury tubes. Part of our problem lies with our bombarder, which requires too much time to heat up, and also domestic electrodes break down and heat unevenly. Masonlite and Eurocom are very forgiving!

"I also take tubes off the manifold very hot, sometimes using a clothespin to hold onto the hot tube. Burning-in takes only a few minutes except for long mercury tubes. Generally we use a 12kv-60ma for burning in but also have a 9kv-30ma for smaller-diameter tubes with lower ma-rated electrodes." ◆

Leybold defends turbo pumps

<From K. Felde at Leybold AG, Germany, comes this rebuttal to "A dim view of turbo pumps" in NN#12:>

The article ... cannot remain without contradiction. Most of the statements contained therein are distorted or completely incorrect. The author is either misinformed or very naive on this subject.

No publication by LEYBOLD AG or any other manufacturer of vacuum equipment would ever contain information supporting the statements regarding tubomolecular pumps found in the above referenced article, particularly "turbo pumps are not appropriate for the production of neon tubes." We comment on the individual statements as follows:

The bake-out of the tube and electrode conversion takes place between 1 and 10 mbar (or Torr). In this pressure range the 3 pump systems mentioned in the article have the following suction capacity:

Mercury ejector pump: one liter per second.

Oil diffusion pump: non-functional.

Turbo pump: one liter per second.

Due to their physical properties, mercury ejector pumps cannot work in this range. In this pressure range the vapor jet necessary for pumping begins to break down in the Hg pump and in the case of the oil diffusion pump this has already happened (0.3 mbar). For this reason, pumping systems with these two pump types incorporate a bypass line with a separate valve to isolate the finish pump (ejector or oil diffusion type) from the system while working above one mbar (or Torr). The mechanical rotary vane pump must be employed alone for this vacuum level. Incorrect sequence in the opening and closing of the valves in the manifold can lead to the following: contamination or burning of the pump fluid; partial destruction of the pump; broken glass splinters entering the pump can cause similar consequences.

Turbomolecular pump

When this type finish pump is incorporated, an inrush of air due to incorrect procedure, accident, power failure or broken glass WILL NOT PRODUCE ANY NEGATIVE RESULTS. Turbo pumps produced in recent years DO NOT require the bypass line, as was necessary with the older models. This is due to the sophisticated circuits in the frequency converters that deal with the sudden changes of pressure. A turbo can be switched on at atmospheric pressure and allowed to progress through a two-minute warm-up cycle in which it gradually reaches the operational speed mode. However, should the turbo be exposed to an unexpected high gas yield, the frequency converter will turn off the pump and display "failure" to the operator. The turbo pump may then be returned to normal operation by first depressing the "STOP" and then the "START" buttons without any risk to the equipment whatsoever.

When one understands the relative technologies and these components, one would not operate these systems without a proper in-line filter to block glass particles, phosphors and mercury. These elements are extremely detrimental to the components in the system, including the vacuum gauges. The manifold interior must remain clean and free from any and all contaminants and glass splinters, which interfere with the function or damage the instruments as well as vanes in the rotary pump (when the vane pump is connected directly to the manifold). The totally clean ultimate vacuum produced by the turbomolecular pump increases substantially the quality and color brilliance of the finished tube.

Cost of the turbo pump

The cost of the turbo pump and converter is somewhat higher than other types only superficially. Today's turbo pumps require no oil as they are factory lubricated, and, of course, do not require mercury, circulating water or liquid nitrogen daily as diffusion pumps do. Since they do not need water cooling systems and have a relatively low power consumption, and require only minimal maintenance, it becomes evident which pump is more desirable for this application. For these reasons, the use of oil diffusion pumps for neon tube production is almost nonexistent in Europe today. One might occasionally find a mercury ejector pump in operation in a very old system; however, it will soon disappear due to environmental safety regulations.

Since mercury ejector pumps are no longer manufactured due to their environmental impact, we are of the opinion that the only alternative is the turbo pump.

Power failure and diffusion pumps

There is also a major point to be mentioned regarding power failure while diffusion pumps are in operation or the shut down procedure at the end of the day. The turbo pump is always outfitted with an electromagnetic venting valve to instantly vent the system to atmosphere should a power failure occur. This cannot be done with the oil diffusion pump because it must be allowed to cool slowly and the system shut down in a specific sequence. Unlike a diffusion pump, with a turbo pump connected, the entire system can be turned off simultaneously with one switch, followed by the light switch, after which the operator can go out the door without a care (a major advantage over diffusion pumps).

Oil backstreaming from vane pumps

First of all it is important to understand that during a pumping cycle it is physically impossible for the vane pump to backstream oil vapor in the direction of the turbo pump. However, this could occur while the system is turned off and remains under vacuum. Any turbo pump, correctly installed, will have an electromagnetic valve incorporated to automatically vent the system in the event of a power failure or when the system is turned off to prevent backstreaming of oil vapor form the vane pump through the turbo pump into the manifold. The turbo pump cannot backstream oil vapor because it does not contain hydrocarbons within the vacuum chamber. All lubricants are located in the motor chamber, isolated completely from the vacuum module containing the rotor and stator assembly.

Oil diffusion pumps

When one has chosen to use an oil diffusion pump it should be understood that backstreaming vapor in the direction of the vessel (manifold) is a fact of life. The measured amounts of vapor were discovered and thoroughly understood many years ago. If one wishes to effectively reduce this backstream flow (reduce, not eliminate), there are a number of components that must be added to the system. The addition of a cooling system to circulate chilled water, a liquid nitrogen cold trap requiring a constant supply of nitrogen as well as a molecular sieve, all of which require cleaning and bake out on a regular basis. It should be further understood that these devices do reduce the gas flow rate and add considerable cost in acquisition and maintenance of these components.

Finally, it should be noted that the quality of the gas discharge tube depends largely on the electrode technology and, of course, the degree of technical training the operator has been subjected to.

<Editors' note: Boonstra declined to respond to the Leybold message, so we asked Mark Snyder to look over both sides and give

(see Leybold, page 23)

Tons of tech tips from a feisty neon veteran

<Editors' note: Responding to our old plea for veteran benders to share their wealth of experience, Jerry Bolton has offered to answer questions and generally have his ear bent regarding neon techniques. He's been a glassblower for decades, is currently doing wholesale bending in the Philadelphia area, and can be reached by phone or fax at (609) 232-7550. Write him at: House of Glass, 590 Lower Landing Rd., Suite 68D, Blackwood NJ 08012.>

By Jerry Bolton

I've been in the sign business for 25+ years, so I guess I would be considered one of your old-timers, though not one to "turn the page" as you implied we do. I've been very fortunate in having the opportunity to work for, manage and/or own several sign companies and have learned a little or a lot from them all, so not all old-timers' minds are closed books.

I've set up about 25 neon plants around the country in all configurations and sizes, utilizing the standard lead glass/greased stopcock manifold, metal manifolds and the greaseless stopcock/pyrex manifolds, the latter being by far the best of the three.

I had mine custom-built to my specs. While I'm fortunate enough to live in scientific glass country (New Jersey) and have several sources for this, you all have at least one place you can go, as every major university in the U.S. has a glass lab. Take your drawing to them and they'll make your manifold. I recommend Ace brand greaseless stopcocks and fittings for this. *<Ace Glass Inc., 1430 Northwest Blvd., Vineland, NJ 08360; 800-223-4524; 609-692-3333; Jerry notes that a "scientific glassblowers rate" discount of up to 75% may be obtained by those doing OEM manufacturing.>*

Be sure they have an annealing oven to remove the strains. If strains are not removed, pyrex will break easily. When properly annealed, that glass is tough! Or buy a commercially built manifold. Be sure to use a diffusion pump with it.

No monopoly on quality

Heard an ugly rumor from two different sources – seems that a couple of manufacturers of so-called high-tech processing equipment that sell in the $15,000-$35,000 range are going directly to corporations, trying to convince them that their equipment is god's gift to neon, and if the sign companies they get neon from are not using their systems, the customers are not getting good neon!

I say: foul!! And I'll tell you what, Big Boys: I'll put my tubes off my equipment up against yours anytime, anywhere. And I'll bet there's a hell of a lot of other companies that can't afford your stuff, and probably wouldn't want it if they could, that would do the same.

I fill and pull every tube off my equipment at 10^{-5} torr or better – most of you big boys don't even use vacuum gauges that read that high (mine's a Hastings NV-8, used by NASA in the shuttles) in your fancy processing stations. My red tubes come off pure red, no burn-in, just put 'em on the rack. And don't give me that bullshit that it's not necessary to get a tube that clean (10^{-5}): I say the purer the tube, the longer it'll last.

I think a key factor in my case is that I pull my manifold and diffusion pump down and thoroughly clean them with Citrinox (available from Fisher Scientific – removes any oils – 412-562-8300 for the nearest branch or a catalogue) and reagent-grade acetone every other month, every month if I've done a lot of pumping (18-24 hours a day). Liquinox works okay too. I have special little filters that stop all refuse, including vaporized mercury, from entering the system. Takes me about four hours on a Sunday to do this.

The cost for new oil for the manometer and diffusion pump is very low; #704 Dow Corning oil for both seems to be the best.

I never pump old mercury repairs on the main manifold. I have a little side manifold and a greaseless stopcock system that bypasses the main manifold and diffusion pump, going directly to the roughing pump, so there's no chance of contaminating the system. Sure, the repair is not as pure, but if the customers didn't want "cheap" they'd have me make a new unit (I give them the option).

Seems some companies are claiming that only tubes processed on their pricey systems are top-quality neon... I'll tell you what, Big Boys: I'll put my tubes off my equipment up against yours anytime, anywhere.

Anyway, I say if these rumors prove to be true (all you folks out there can help verify this and report it) that we should boycott these companies and all their products.

**** 'em, what are they trying to do, run us little guys out of business? Or at least prevent us from landing a large account because we don't use their so-called "superior equipment"? And at the same time they want us to buy their glass and electrodes? **** THEM!!

Pet peeves

1.) Neon companies that do both wholesale and retail work – get off the fence! You sell your product cheaper (retail) than my customers can due to overhead, etc., and you sell wholesale cheaper than I can because you make it up on retail. I realize in the smaller market areas you must do both, but in the large metro areas, you kill the wholesale market and eventually yourselves – think about it (it's the economy, stupid!).

2.) Suppliers of neon equipment, glass, gas, electrodes, etc., as well as sign-company owners, wholesale neon-company owners, and their salesmen who all swear and promise that their mercury tubes never stain or darken – BULLSHIT!

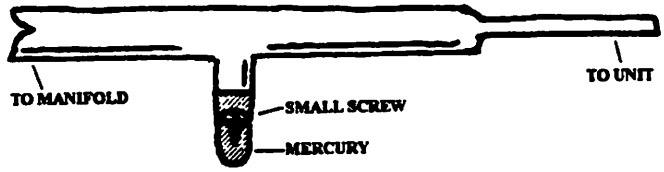
Due to rare-earth phosphors, electrode manufacturing procedures, pumping methods, pumping equipment, transformers, etc., nobody can prevent mercury staining. There are things you can do to reduce this effect considerably, but you can't stop it.

So be honest to your customers and you might be surprised how often they come back to you.

On the other hand, Roger at Tunewell told me his transformer does indeed clean up mercury stains due to his alternating polarity design. But if you put a conventional transformer back on the same tube it'll start staining right back down again. Roger says his transformer doesn't "eat up" the stuff in the tube that causes staining, but keeps it in a constant state of agitation so it doesn't settle in one place.

Horror story

I know a guy who works for one of my local competitors, and he has a metal manifold with some sort of mercury reservoir.



He uses a magnet to lift the small screw out of the reservoir, with mercury in the slots where your phillips screwdriver would be placed, then he dumps it in somehow. The way he fills the reservoir

(see Bolton, page 24)

A third perspective on turbo & diffusion pumps

<Editors' note: We handed Mark Snyder of Precision Neon Laboratories a thorny assignment -- we asked him to shed some technical light on the turbo pump controversy, since Dick Boonstra declined to answer the Leybold letter in any detail. We had no idea that he would come up with what his wife Toni called "a small novel," and we are grateful for his incisive opinions and nuts-and-bolts research. Turbo-pump advocates are welcome to continue the dialogue in future issues; we'd particularly like an informed turbo pump USER's technical insights.>

By Mark Snyder

In regards to your controversy on turbomolecular pumps between Dick Boonstra and K. Felde, it would be next to impossible to extend my knowledge, expertise, concerns and recommendations in the format of a simple "verdict," as you have requested, and do justice to your readers, your newsletter, and this controversial topic.

But, stated most briefly: Boonstra's comments and concerns about using a turbomolecular pump, in conjunction with internally bombarding luminous tubes, are well-founded in my opinion. In the real world of neon tube production there are simply too many reasons not to use them, and too many things that can go wrong with them.

Precision Neon Laboratories is a high-vacuum equipment manufacturer and distributor of other vacuum equipment, not only for the neon industry, but for research and science studies as well. We try very hard to keep an open-minded, objective view as to what equipment is best suited, over all, for a particular application. We could easily sell turbo pumps for use in the neon industry, as others do, if they were the best choice. We do not, because they are not.

If, for some reason, particulates do come in contact with turbine blades while they are at speed, expect to pay $1,500 to $2,000 to have the pump fixed. If you have a fat back account -- go for it! You can tell all your friends, "I have a TURBOMOLECULAR PUMP that can suck the snot out of an elephant." Only problem is that if the snot got into it, it would trash the pump.

K. Felde of Leybold appears to be uninformed concerning modern diffusion pumps, and the technological advances they have made in the last thirty years or so. I feel his comments are at best very misleading. When most industries seek vacuum equipment to produce good ultimate vacuums (<10^{-9} Torr), high pumping speeds, high throughput, high tolerable forepressures combined with rugged dependability, they do not choose a turbo pump. They choose the appropriate oil diffusion pump.

Since the late 1950s and early 1960s, many researchers (in Germany as well) have written about how "inherently clean" oil diffusion pumps are, and that "there is no evidence of oil vapor backstreaming." And diffusion pump technology has progressed in the last thirty years, not regressed. If they didn't have problems with oil vapor backstreaming thirty years ago, what would make someone think they do today?

Even small turbo pumps are at least ten times more expensive than diffusion pumps, and don't work as well under the same conditions. The performance per dollar ratio is, simply, backwards.

The fine print on pumps

In a future article I would like to expand on the reasoning behind our choice of diffusion pumps over turbo pumps for neon production. In the meantime, I will present a few excerpts from written material supplied by other authorities in the high-vacuum field that seem to refute Feldes' remarks about turbo pumps and about backstreaming in diffusion pumps and mechanical pumps.

1. Leybold's own brochure on turbo pumps (as well as other manufacturers' literature) states that "water cooling is standard..." However, what Felde stated in his letter was, "Today's turbo pumps... do not require circulating water... they do not need water cooling systems."

2. Felde stated, "It is important to understand that during a pumping cycle it is physically impossible for the vane pump to backstream oil vapor in the direction of the turbo pump." To the contrary, among other sources the LDS Vacuum Products Reference Manual (a well-known leader in high-vacuum and ultrahigh-vacuum work) states: "All oil-sealed mechanical pumps backstream oil to some extent. Most oil-sealed mechanical pumps will throw small droplets of liquid oil that have been mechanically generated out through the pump's intake. These droplets will quickly wet the surfaces of the pumping line. Once the oil has wet the surfaces, it will spread evenly over any surface it can reach. This phenomena is referred to as surface creep." The manual continues, "Surface creep will also occur right out of the pump itself with the oil reservoir within the pump acting as the source. In many cases, this constant surface flow of liquid oil from the mechanical pump into the rest of the pumping system is the greatest single source of hydrocarbons that can enter the vacuum chamber."

3. On the same topic, Felde continues by saying, "The turbo pump cannot backstream oil vapor because it does not contain hydrocarbons within the vacuum chamber. All lubricants are located in the motor chamber, isolated completely from the vacuum module containing the rotor and stator assembly."

Whether or not Leybold uses bearing lubricant that contains hydrocarbons -- some manufacturers use frictionless bearings that require no lubrication at all -- I know of RGAs (residual gas analyses) that have been done on turbos with lubricated and non-lubricated bearings and still have shown the presence of hydrocarbons. These hydrocarbons did not necessarily come from the turbo itself. In the words of LDS Vacuum Products, "Do pumping systems with modern turbo pumps backstream? Sometimes. RGAs of turbo-pumped chambers will occasionally show hydrocarbon contamination...the usual source is identified as mechanical pump oil, mass 57 and mass 59. Once oil enters the exhaust port of a turbo pump [via surface creep], it becomes possible for that oil to traverse the turbo and enter the chamber [manifold]. In the real world of turbo pumps operating in the field, mechanical pump oil can and does enter the chamber..."

(Incidentally, intake screens or filters for turbo pumps can reduce pumping speed by as much as 40-50 percent, depending on the size of the holes in the screen or filter -- it all depends on how much trash you want to keep out of it.)

What does Varian Vacuum Products, a world leader in ultra-high-vacuum technology, have to say about exposing an operating turbo pump to atmosphere? "BEARING LIFE is the most critical item in regards to pump maintenance, and it depends on the type of usage. The basic situation is when a pump is kept in continuous operation at low pressure. Sudden air inrush, for example, will apply a force to the rotor that is transmitted to the bearings. Therefore, bearing life will be affected by the number of air exposures while operating."

I could continue on this subject, but given time and space limitations I would like to make a few points on Felde's comment, "When one has chosen to use an oil diffusion pump, it should be understood that backstreaming vapor in the direction of the vessel (manifold) is a fact of life. [This was] discovered and thoroughly understood many years ago."

What I would like to know is: just how many years ago is Felde talking about?

Taken from NCR Equipment Corp. Technical Bulletin #0100-02, dated 1962, entitled "Diffusion Pumps and Ultra-high Vacuum," is the following information on the cleanliness of diffusion pumps:

"Partial pressure analysis: In addition to the wettability test, mass spectrometer measurements of partial pressures can be used to detect the presence of or prove the absence of hydrocarbons. The following references indicate that vacua free of hydrocarbons can be obtained with oil diffusion pumps.

"I. "The Measurement of Low Partial Gas Pressure with the Mass Spectrometer" by Dr. H.W. Drawin and Dr. C. Brunee (Atlas-Werke AG, Germany) from Vakuum Technik, No. 3, 1960 – The following partial pressures were obtained with mercury diffusion pumps. Using oil diffusion pumps, very similar results were obtained at total pressure of 3×10^{-9} mm Hg.

Hydrogen: 1×10^{-9}
Water: 1×10^{-10}
Carbon Monoxide: 5×10^{-10}
Nitrogen: 5×10^{-10}
Carbon Dioxide: less than 1.5×10^{-9}
Hydrocarbons: less than 1×10^{-10}
Mercury: less than 1×10^{-10}
Total pressure: less than 3.3×10^{-9}

The author says, "...With both pump types, about the same ultimate partial

(see Snyder, page 20)

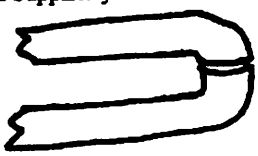
Supplies, suggestions, and strong opinions

Jerry Bolton shares some favorite suppliers:

"Joe at **Tordiff Tool Company** (801-451-5447) has double swivels and good brass electrode holders. His double swivel kit is the best on the market, patterned after the Snyder kits of the '60s – no stick, no leaks, no boggles, lasts forever, great rubber "something" that fits 10mm-15mm, doesn't slip off, and with care it won't shred. One lasts me or my folks about a year, doing vast quantities of wholesale neon.

"Cost: $5 for a kit of one double swivel, one rubber-tapered stopper, two alligator clip covers (for outside-the-tube connections, rarely used). Joe sells brass electrode holders for $2.50 each! 10-12-15mm, 18mm too for $3.

"**The round tipping torch** that you refer to <*NN #8*> is made for Voltarc, and any sign supplier in the country can get them for you through them. Set it up right and it'll splice 15mm with ease and speed, and still do your 5mm connections (electrode to manifold). Tell your Sign Supplier you want a Voltarc #500-T tipping torch.



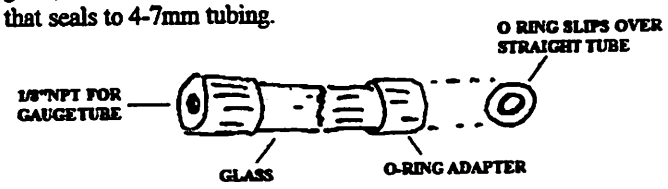
DOUBLEBACK SPLIT IN TWO

"Want a **great glass cutter**? Call Kitco in Denver (303-623-4142) for a top-quality product. Get two handles: one for 15mm, one for your other most common size (in my case 12mm) to save time in changing wire. I use mine all the time – used right, it'll cut a doubleback in two without splitting <*see drawing*> and show you how even your bend is! Kitco also has a double-swivel kit...

"Want to switch to **metal tanks? Spectra Gas** (201-372-2060) has the best, in my opinion. You will be dealing direct so you'll save money – very high-quality components – two gauges, one for contents of tank and one for line pressure – you don't have to return the tanks when empty, just toss 'em and connect a new one – cheaper per liter than others – ask for Keith and he'll set you up the proper fittings for your application."

Marty Fries at Imagimedia in Albuquerque NM sends another paen of praise to **Duniway Stockroom:**

"Are you tired of paying premium prices for vacuum pump oil? Duniway Stockroom (800-446-8811) sells their CVP-180 oil for $10 a gallon. I spoke to Bob, who says that their technicians who rebuild the pumps use the 180 oil in everything belt or direct drive. Their catalog shows a CVP-190 oil at $15/gallon for direct drive pumps, but the technicians feel that the 190 oil doesn't make a difference and isn't worth it. He says the 190 oil is filtered more. Also, they don't use any special "pump flushing oil," just the same 180 oil. These guys ONLY do vacuum pumps and equipment, so I trust their judgement. Also, their TCG-06M thermocouple vacuum gauge (previously mentioned in NN) works great for only $189 or $239 in a metal box. The gauge tube is metal, with a 1/8" NPT thread so you'll need an adapter to connect it to a glass manifold. Chemglass (800-843-1794; ask for their glassblowing components catalog) sells the necessary parts to adapt it to different types of manifolds (pyrex, soft glass, different configurations, etc.). They also have a #CGS-350-01 that seals to 4-7mm tubing.



With adapters like this you could measure the vacuum achieved IN THE TUBE by using a tubulated electrode on both ends of the tube and attaching the gauge there."

<Marty brings a background in CAD (computer-aided design) and electronics to neon art; he invites others interested in technical experimentation to fax him at (505) 344-9313.>

A new **electronic choke** is on the market that's relatively cheap ($695), lightweight (8 lbs.; easy to ship), and allegedly won't give a momentary high-voltage surge when power is first applied (no slam/stick with the milliamp-gauge needle). There are four sizes, to match 5-, 10-, 12.5- and 15-KVA transformers. Contact Victory Neon Equipment, 1800 Roberts St., Wilmington IL 60481: (815) 476-4173.

TecnoLux is introducing a new line of clear lead glass phosphor-coated tubes they call "ultraclean." These have been cleaned ultrasonically prior to coating, with the ends sealed immediately afterwards. They are being offered in an assortment of whites and colors, using triphosphor (rare earth) blends, and are five feet long. Contact David Ablon for more information: (718) 439-1222, fax (718) 439-0497.

Neon Dynamics has some new transformers: a 30ma 12-volt model; a "Flo-scripter" model and also a unit for small tubes (apparently using their regular models on small loads trips the short-circuit sensor).

EGL sent us literature on new products of theirs, including a 16" ribbon burner with economizer; digital vacuum gauge; bromo-purple colored glass; cold-cathode housings and a stainless steel tipping torch. They're also now selling the more expensive colors of tubing in a "value pack" of ten pounds per box, so you don't have to shell out bigtime when a smaller amount will suffice. ♦

(Edward, from page 12)

with her movements, as did her golden hair. She whispered, "Do not worry, my son, I can free you from the bucket of yogurt in which you are trapped."

I sat in total amazement (wouldn't you?) and watched as the cracked unit, still in one piece, floated effortlessly through the air toward a bending table. All of a sudden the enchanting music stopped and the unit started a rapid descent to the floor, as did my lower jaw.

Then the apparition grinned a shit-eating grin and the music started again. The unit rose to the tabletop, and as it came to rest a hole appeared under the cracked section. Still I watched in amazement, trying to close my mouth.

With her single flame, the apparition tickled the stressed glass. Working the fire with quick flicks of her wrist, gradually slowing her movements and bringing the 10" dancing flame to a fine blueish-white point, then back again to its dancing elegance, a process lasting 7-10 minutes.

I couldn't believe my eyes. The crack, warmed with dancing fire and chased with pinpoint accuracy, disappeared. So did my savior, to whom I am forever thankful.

The moral: Play with a single-tip hand torch when you have the chance to do so; it will pay off in the future. You too may be able to avoid having to remake a hell of a unit... ♦

The boys in the book: A one-eyed look at art

By Val Crawford

An unfunny thing happened at NESA: someone erased the women in neon art.

Actually, that's not quite right – Christian Schiess didn't see them in the first place.

Nonetheless, both NESA and ST Publications, not to mention various academic funding agencies, have showcased and supported Schiess in his progress toward a new old-boy book, "The Light Artist Anthology," without so much as a murmured inquiry as to where the women went.

Now, if the title stipulated "male light artist," I'd leave the guy alone. But no, the project was funded as a survey of the field, and women artists figure heavily both in terms of numbers and significance in the realm of electric art.

And what really surprised me was talking to this mild-mannered, otherwise inoffensive person, as he answered my simple query with several poisonous stereotypes. The brief encounter went like this:

Me: "I understand that most of the artists you profile are men."

Him: "They all are. *(Pause.)* I guess that's not really 'politically correct', is it? *(Weak chortle)*. Well, I know there's Lili Lakich and Chryssa, but I really didn't want to focus on them. *(Pause.)* And there really aren't that many women doing sculpture, statistically..."

Zero for three, buddy. I noted that more than half the art in MONA's ten-year retrospective represented women artists, but other than that I'm afraid I just groaned and turned away.

Later I did ask Mary Carter of MONA to confirm my impression that there many noted women artists working with neon, and she sent back more than a hundred names. And these primarily represent the American scene; in addition, consider that the countries to which Schiess travelled on his Fulbright ticket had plenty of noted female neon artists as well. And there are many more "light artists" who don't work with neon...

Mind you, this isn't a book review; I'm sure there are many things to enjoy about such a lavish representation of neon art. So is it mean – or, god forbid, "petty" – to pick on a poor academic who did nothing worse than collect grants to research a pretty book?

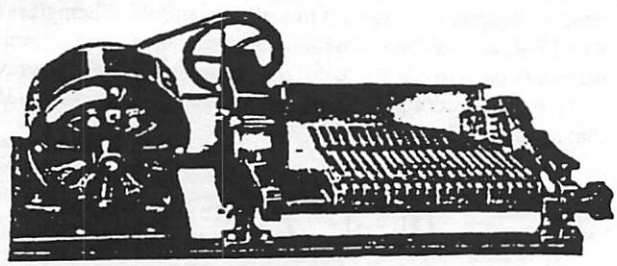
I think it's worth mentioning. In fact, I think everyone should notice the omission of half the neon world. Why look at art with one eye shut?

So I'm going to write to the funding agencies and complain. Oh, I know, they can't censor or influence an artist in the throes of creative work, but they may consider funding Volume Two: "The (Female) Light Artist Anthology."

Give me tokenism over total invisibility any day. And this time, give the grant to someone else. ♦

*<**The Museum of Neon Art's Mary Carter** backed this sentiment up with the following list of women neon artists, and added, "It is critical that women are not written out of this new history.">*

Margaret Adachi
Carol Adams
Linda Ames-Bell
Elizabeth Armstrong
Cynthia Bach
Frances Basham
Adrienne Beck
Pamela Bennett
Dea Black
Naomi Block
Dorothy Bosco
Robin Brailsford
Kathy Brenner
Amy Brown
Susan Caiza
Nancy Cameron-Egan
Donna Capka
Chryssa
Nancy Clark
Sheree Clark
Helen Cohen
Claire Cooperstein
Josie Crawford
Rita Daly
Marja de Boer Lichtveld
Patricia Deluca
Margaret Desmond
Deborah Dohne
Tessie Dong
Lois Dorfman
Bubbs Edelweiss
Janet Evans
Julie Fabi
Susan Firestone
Petrie Fishman
Simone Gad
Stephanie Gassman
Cheri Gaulke
Candice Gawne
Joan Glase
Margery Goldberg
Marijke de Gooi
Sue Gould
Sally Griffin
Jane Handel
Rie Haru
Jane Haskell
Maureen Harvey
Lisa Hollender
Janine James
Elaine Jason
Claire Johnson
Madeline Kaczniarezyk
Janis Kanter
Myrna Katz
Kathy Kearns
Joyce Kelleher
Suzanne Klotz
Kim Koga
Margie Lacy
Lili Lakich
Jackie Lavin
Sharon Lawson
Laurie Lea
Cara Lee
Alice Lees
Susie Lermo
Federica Marangoni
Betty McDonald
Cynthia McLaughlin
Melanie Mills
Patricia Carr Morgan
Karen Mortillaro
Lori Mulheim
Phyllis Nathanson
Janet Fryer Nedeau
Sherry Nickell
Moira North
Carol Palermo
Sue Patton
Beverly Reiser
Victoria Rivers
Mary Rodriguez
Debra Lee Rose
Jan Sanchez
Ellen Sandor
Margi Scharff
Rima Schulkind
Karen Schwenkmeyer
Christina Sicardi
Moira Sina
Lane Sladovich
Sabrina Sosa
Stephanie Stephenson
Cathy Stone
Joyce Tamara
Kitty Thomas
Linda Toliver
Susan Urquhart
Mary Voytek
Anne Walenta
Candice Watkins
Lucy Wildrick
Alice Wright
Christine Yelle
Dana Zed



(1928 Betts & Betts flasher)

(Boonstra, from page 10)

ability to see any mercury adhesion or droplets from the outside. However, in practice (here in Europe) I've never seen a someone clean a manifold in a shorter time than it would take to build a new one. Especially when cleaning with fluoric acid, you get a lot of tension in the welds, so it must be oven-annealed afterwards. After a while the greased stopcocks will become unreliable as well, with leftover or sucked-in grease influencing the conductivity of the manifold.

With a stainless steel manifold the mercury droplets will form in exactly the same time, so it is a matter of experience to know when to clean it. The NW-KF type stainless manifold has a great advantage for cleaning, as it comes apart easily, without risk of breakage. ♦

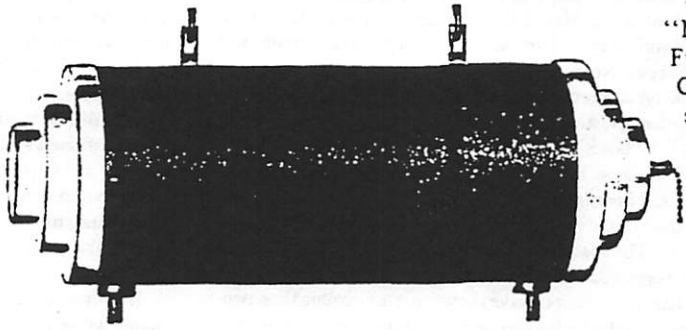
Old equipment names spark fond memories

<There were several responses to our recent query about old equipment from Sola, Thordarson and Supra:>

EGL's Kevin Rourke informed us that "Supra" was a glass-coating company that EGL bought, changing the name.

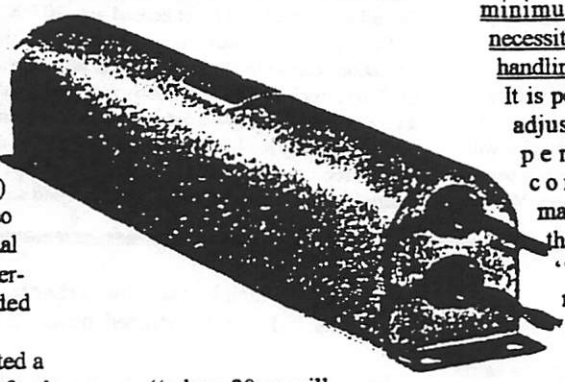
Jerry Bolton wrote to say, "Sola, years ago, made a great bombarder, many still in use. I have a 12.5 KVA I use every day."

Bob Lind adds, "I believe Jutras in Manchester NH has a Thordarson 12kva 45 ma for burning in, if my memory serves me well; mini-suitcases they were. Sola made many types of ballasts and I remember the 120 ma c.c. types; Supro-Lux made electrodes and fluorescent tubing."



Tod Swormstedt, Signs of the Times, sent us many pages from old ST issues, an excellent example of "history through advertisements." We learned that:

Thordarson Electric Manufacturing Co., Chicago, "transformer specialists since 1895," first made neon transformers in 1924 (the first ST ad Tod found was 1928). In a 1930 ad they introduced a new transformer, "attractively finished in green indoor-type crystal-baked enamel" with "six-feet high tension leads covered with green rayon silk." (Gee, why can't we get 'em like this anymore?) In this same ad they also note, "We are the original patentees of the center-tap, midpoint-grounded transformer."



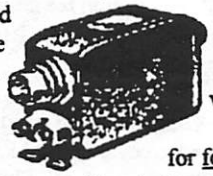
In 1938 they promoted a new 45ma transformer for those cases "where 30ma will not give true color or sufficient brilliancy..." In 1939 and 1940 their full-page ads show spectaculars and large sign installations made with their products; however, 1940 is the last year they advertised.

Sola Electric Co. of Chicago first advertised in 1933, with later ads indicating that the company was founded in 1930. They had some very classy-shaped transformers, such as the CYL-INDOR shown here.

Tod notes that "Somewhere in the early to mid-1950s they quit promoting transformers in favor of ballasts." An April 1955 ad for bombarding transformers lists sizes from 5 kva to 22.5 kva (yow!), and – get this – either a sliding-core choke or DC reactor choke (so who says electronic chokes are new?). The last ad (for ballasts) is from 1961.

Other interesting old ST ads:

– A 1936 Jefferson Electric Company ad, asserting among other things that "the mid-point grounded balanced design <was> pioneered by Jefferson engineers, no other design principle has equalled it in dependability and efficiency." (So Jefferson pioneered it -- sounds like it, Thordarson patented trouble or what?)



– A 1928 ad for a Cenco Supervac pumping station, complete with mercury diffusion pump, for $180.

– A 1928 ad for formica tube supports, very simple cylinders with a bottom hole for a screw and two side holes on the other end to pass tie wire through.

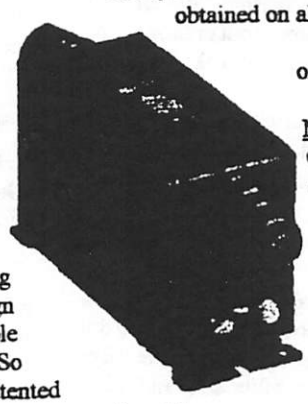
– In 1928 Betts & Betts Corporation advertised flashers with "superior mechanical design without freak construction..."

– In 1930 a small ad for "bombard-ers for neon tube electrodes" from Lepel High Frequency Laboratories Inc., New York City.

-- Also in 1930: "Neon Effect at a Fraction of Neon Cost" – does this sound familiar? "Ray-o-gram when lighted shows an actual "RAY" or "GLOW" around each letter due to a special process we have recently developed." (I guess it never caught on.)

– From 1930: "A new type of bending fire has been developed by theTechnical Laboratories (of Los Angeles)... Simple in design and operation, the fire is said to reduce to a minimum the necessity for skill in handling the tubing. It is portable, with adjustable head, permitting convenient manipulation of the glass. "The fire is not of the ribbon type, nor like the crossfire, but is said to develop greater heat than either type. It is adaptable to any kind of gas and can be used with either high or low air pressure. One of its chief features ... is that there are no protruding valves or elbows to obstruct the tubing in its circular motion, and consequently an even heat may be obtained on all sides of the tube."

An April 1955 ad for bombarding transformers lists sizes from 5 kva to 22.5 kva, with either a sliding-core choke or DC reactor choke. (So who says electronic chokes are new?)



– Also 1930: a brief mention of neon on cars and trucks.

– In 1938: Modern Streamlined Neon Sign Designs by Sam Kamin of Lima, Ohio, was advertised for $3.50 (anyone have a copy of this?). The next year, Thordarson was offering a new Neon Sales Manual for only fifty cents a copy, or three for a buck!

– Also 1938: A full-page ad for "Warren's POWER COLORS" (coated tubes), complete with "WARNING! For your protection, every length of genuine Warren-made POWER TUBING is labeled. Look for the Warren label on the tubing you buy, and be sure it is there before you accept the tubing." The tubes were manufactured by St. Charles Technical Laboratories of St. Charles IL. Anyone know how long they were around? ◆

(Transformers, from top: 1934 Sola CYL-INDOR; Thordarson 1939; Sola 1936; Sola 1950)

(Snyder, from page 16)

pressure can be obtained with the exception of hydrogen. The partial pressure of hydrogen was at least ten times higher with the oil diffusion pumps compared to the mercury pumps." (It may be noted also that the reduction of foreline pressure of a diffusion pump reduces the amount of hydrogen on the high vacuum side..)

II. Norman Milleron (Lawrence Radiation Laboratory, University of California, Livermore, California) at the 1st Symposium on Surface Effects of Spacecraft Materials, Palo Alto, California, May 1959: "Diffusion pumps have been demonstrated to be inherently clean... First, diffusion pumps, both mercury and oil, can be completely trapped. No oil or cracked hydrocarbon spectrum, and no mercury, down to partial pressures of 10^{-11}mm Hg for oil ... is detected."

III. "Mass Spectrometer Investigations in the Ultra-High Vacuum," By P. Jahn & J. Zahringer (Max Planck Institute for Nuclear Physics, Heidelberg), Vakuum Technik, No. 10, 5, June 1961: "A very sensitive mass spectrometer – allowing the measurement of partial pressures below 10^{-12} Torr – was used to investigate the composition of the residual gas in vacuum system, as obtained with oil diffusion pumps... The spectrum of the residual gas was checked daily during several weeks whereby different types of pumps, baffles and pumping fluids have been used. The investigations have shown that the combination two-stage pump plus silicone ultra fluid, plus aluminum oxide trap, has been proven suitable for production of ultra-high vacuum. The pressure remains constant for many weeks at its initial value and the residual gases from the pump are only methane and hydrogen."

Over the years there have been numerous articles written on this subject to support the findings of these researchers. The advances in diffusion pump technology and the resulting design improvements in the last 30 years have only improved diffusion pumps' tolerable forepressure, pumping speed, throughput capabilities and ability to restrict vapor backstreaming into the manifold – they have not lessened these capabilities!

Incidentally, ALL vacuum equipment requires some type of maintenance at some point in time, even if it has permanently sealed lubricated bearings. The simple fact that a turbo pump pumps water vapor and other gases through it will eventually cause a residue to build up on the blades. Even if the pump is baked out during operation, this in itself will not get rid of all the contamination. At some point in time, the turbo pump will have to be dismantled for cleaning. Sending a turbomolecular pump in to the factory for overhaul is NOT what I consider minimal maintenance, as Felde asserts.

I will say that Boonstra may have somewhat overstated his concerns and the drawbacks of the turbo pump relative to neon production. However, based on my experience, knowledge and information at my disposal, I do not feel that he misled your readers either.

The fact is that many ultra-high-vacuum systems (including those in the semiconductor industry) have foregone state-of-the-art turbo pumps in favor of the more reliable, less expensive, clean-pumping modern diffusion systems. Additionally, many turbo-pumped systems are used in conjunction with a good diffusion pump, placed between the mechanical pump and the turbo pump. This is so the diffusion pump will provide a low enough fore vacuum for the turbo to operate efficiently. Large multi-stage diffusion pumps only require 300 to 600 microns of fore vacuum to begin operating, and according to pumping speed charts, pump very efficiently at around 50-75 microns of fore vacuum. On the other hand, turbo pumps require 5 to 8 microns to operate efficiently for a comparably sized pump, according to Leybold's own published pumping speed curves.

However, if not for cost, its fragile nature, or a host of other reasons, turbo pumps as well as metal diffusion pumps should not be used for luminous tube production using the internal bombarding method because of the danger of a high-voltage flashback through the manifold to the grounded metal pump body. And if you don't believe that glass fragments and flashbacks can damage a turbo pump, just ask the shops in Australia that have been using them and replacing rotor and stator assemblies at $1700 each every time something gets sucked into them – even with the filter screen in place. Not to mention what would happen to the turbo's controller if it got zapped with 20,000 volts from the bombarder.

I feel that the best asset someone can have in this industry today is a diverse education relative to all the disciplines and practices involved, coupled with a LOT of common sense. How much particulate matter, regardless of size, would it take to damage a thin-bladed turbine rotor spinning at over 70,000 rpm? Since a diffusion pump has literally no moving parts, would even large glass fragments or other foreign matter actually damage the pump? Or would it simply have to be cleaned out by the user and then put back into service? You decide. ◆

(NESA, from page 7)

uses this method with balletic grace.

Meg had a story about a more mundane matter, however: she said that when NYEGW moved to its new quarters, a nice shiny floor awaited them. However, no one had counted on the floor's resin coating EXPLODING when hot glass was dropped on it...

She also raised an issue worth fighting about: **poorly maintained neon in "public art"** (not commercial) settings. She says a lot of once-great art works that she sees are still partially lit but look nothing like they did or should due to tubes burned out or broken and never replaced, such as a large-scale Stephen Antonakos piece in New York City.

Another artist, Lee Champagne, had a conflict with city government over maintenance of his own piece. It's bad art and bad for neon; anyone have any ideas or experience with including service clauses in contracts or commission agreements?

Seen and overheard

A few **new gadgets** on display seemed to call out for incorporation into a neon piece, from the ultraslick and eternal Enameltec 200 dpi porcelain enamel signage (it's even photosensitive) to the little "Eye Catchers," spangles that hang loosely from billboards and other urban clutter. A nifty sample strip of these in holographic and metallic colors promised some kinetic action if combined with neon; introductory kits are available from Solaray (fax 310-834-7005). Drop us a line if you give it a try...

Andy Tassi, a Voltarc spokesman from the Neon Engineering Group in Ontario, warned about heating glass too fast when bombarding, which he said can **carbonize** rather than burn out the impurities. If they're carbonized, he said they will continue to degas.

Paul Roxy said Capitol Vacuum in Chantilly VA has good **used vacuum stuff**; ask for Joe. Christian Schiess recommended H.T. Vacuums of San Leandro CA for used equipment.

(Paul had a funny story about neon close to home: His house is in a cornfield, visible from all around, and it has neon in all the windows. He had a lot of trouble over this with the local folks at first. Now he says things have turned around to where not only is there neon at the general store, but his neighbors complain if it's turned off!)

Jed Schleissner and Matt Thompson both saw an itinerant vendor on the streets of Vegas with a **roadside display of neon** cacti and other cliches, powered by generator. The neon was made in Phoenix and sold for very cheap.

Favorite not-for-real name at NESA: **"We Bend Over Neon"** – a consortium of four Bay-area benders working for different sign companies who drove down together and registered under the fake name because "We heard that if you're all from one company, the first person pays the full registration fee and the rest get a discount. Not true – we all paid full, and then had to walk around the convention with this stupid name tag!"

Tom Cage of Neon Glassworks in Louisville CO says he too encountered the **con man** we covered in #11, or someone with a very similar MO... Kevin Rourke said all Philadelphia benders use

(see More NESA, page 22)

THE LIGHTER SIDE OF NEON

Better bending for who? A paranoid fantasy

By Audie Foote

I have uncovered an insidious plot, a conspiracy with overtones so treacherous that it makes that JFK thing pale by comparison. (Oliver Stone, are you listening?) *<To The Neon News? Are you kidding? – eds.>* More importantly, are you glass jockeys hearing this? Because it's you, I mean us, who are in imminent danger.

The U.S. government and certain sign conglomerates have hatched a plan to keep this country from losing the Sign Wars to other markets. I see I have your attention now.

It all started when I got my yearly visit from an old-timer, and as usual he brought along his blowhose and file and spent a day with me while his wife spent all their money at the mall. So he's bending away, demonstrating a technique, when all of a sudden I notice that his blowhose does not go directly to the glass, but to a little contraption in his shirt pocket and then to the glass. So I say, "Hey, Gordie, what's that thing in your pocket?"

"This? Oh, that's a spit-catcher." A WHAT? "A saliva collector."

Well, my first remark was "EEEEYYOUUU," but suddenly a nagging thought I'd had lately crept back into my consciousness: Another mysterious innovation had wormed its way into the glass-bending world. So I asked, "Where'd you get that thing?"

After thinking about it for a moment, he scratched his head and said, "You know, it was on my table at work one day, with a note that said, 'This is a spit-catcher – try it.' But there was no name on the note so I assumed it was one of the suppliers that left it."

Uh huh. Just what I thought.

Doesn't it strike anyone as being strange that for the whole of the 20th century, the craft we call "neon" had not changed one iota, until VERRRRR-R-RY recently? And has anyone bothered to notice that the best and most experienced tubebenders, the old-timers, have been disappearing? Who's taking them, UFOs? Hardly.

You folks are lucky to have me to figure this out for you, because it's obvious that you just don't get it.

The old-timers are being abducted and held for study at what I believe are massive underground neon facilities at Skull Valley, Arizona. And what's going on down there will curl your hair faster than a ribbon burner!

What do they want with a bunch of old guys? Certainly not their poor hunched-up bodies. No – they want their brains. They want their genes. They want evolution-perfect DNA. The building blocks of an unstoppable, omnipotent neon machine, working 24 hours a day without coffee breaks.

No sick days. No hangovers. No bad, loud country or rock music. Less than minimum wage. And get this: not a single bad bend. Ultimately, no spit-catchers will even be necessary. There will just be some 80-year-old brain in a glass vessel (a gas flask perhaps?) with wires going in and octopus-like arms coming down and bending fifty units simultaneously.

Meanwhile, they are using the DNA extracted from saliva to clone other great tubebenders like myself. But rest assured, they won't get SPIT from me.

Want more evidence? Just look around you. These innovations you see are not just a coincidence, nor are they really for us. They are using us as guinea pigs to develop "Frankenbender" or "RoboBlower."

At the sign convention in Las Vegas recently I saw a manifold with a steering wheel, for god's sake. What's it for, bombarding or taking kids to school? And the pyrex glasswork in these contraptions was not made by some old bender with a four-day stubble, a tooth missing and a cigarette hanging out the side of his mouth.

No, it was made by the diabolical minds of the corporate world. Laser-beam devices to replace files for cutting glass, and probably in place of fire for bending too! I've heard of a shop that has the bender wearing a parachute harness attached to the ceiling by bungee cord so the poor slob doesn't have to stand all day – but he's also confined to a certain area so he won't wander away and goof off. Soon a computer attached to his brain will make the bungee unnecessary.

One day, if we take action now, this will all be behind us. They'll make a movie called "Invasion of the Bendersnatchers" starring Robert Redford as me and Donald Sutherland as Mouthpiece, the former government biggie who drops the anonymous leak.

But for now we must unite and stand against them. Hide your blowhoses. Throw away those spit-catchers. Protect your mercury-stained brains from their master plan. I will be your LEADER!

Get in contact with me and tell me what you see. You can write me in care of the Hawaii State Mental Hospital, Security Unit #1. I must go now, they're here with my medicine, but remember, be careful because Big Bender is watching, watching, always wa... ◆

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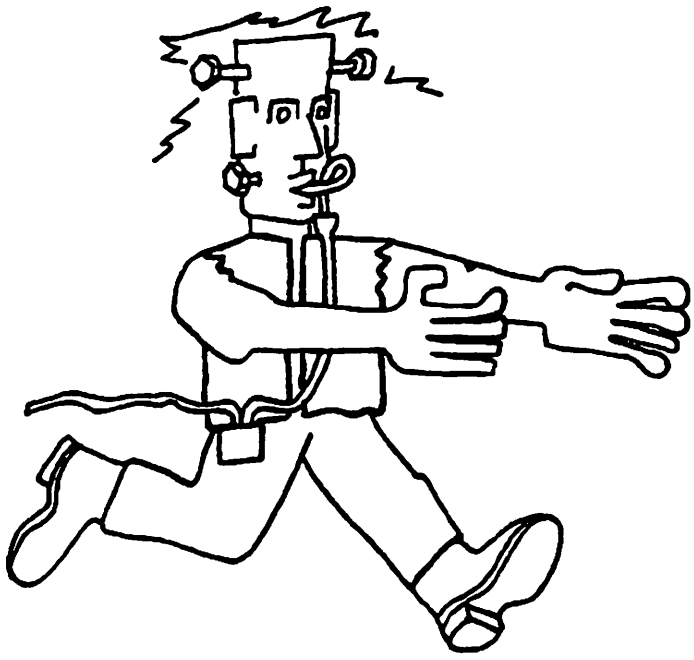
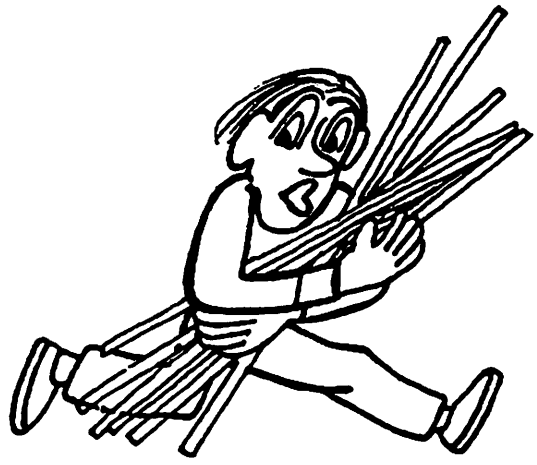




(More NESA, from page 20)

jewelers' torches... Jim Breen of Oakland CA gives an **earthquake guarantee**: "Up to 7.O on the Richter scale"... **FMS** in Minneapolis now sells Italian colored glass with their own coatings, but still no water-based blockout paint. They've also dropped some of the double-coated colors from their line and added other colors.

Ted asked Bruno Tacconi from TecnoLux about them someday producing **black glass**, for "archival-quality" neon (no blockout paint to disappear with time). Bruno said that making the glass itself would be no problem technically, but that when they do a run it has to be large volume, and they'd never sell even a small fraction of it.

Neon seminar

The **neon seminars** were a mixed bag of impassioned complaints from the floor and advice from the panel of experts.

Voltarc's Larry Bourque noted that high-tech processing finally seems to be catching on: "For many years, neon sign fabricators resisted buying" high-vacuum equipment. Another area where he noted improvement (and voiced continuing concern) is proper wiring; he particularly recommended midpoint grounding and safe transformer loading. He deplored the 15,000-volt maximum transformer standard, noting that some places specify a 3,000-volt transformer limit! Bourque also said the quality of neon signage in general is compromised by "unfair competition" from low-buck sign companies who don't conform to UL installation standards.

Transco's Henry Brown addressed the issue of staining by recommending that shops follow the proper pumping procedure for the particular electrodes being used. He also urged benders to adopt a more scientific, high-tech approach to pumping: "You need to know what you don't know" about the physics and chemistry of neon. And a practical piece of advice: use your manometer as a pressure gauge when pumping (evacuate system, close gauge valve, fill with a few torr of air to start bombarding).

Staining was the topic of many questions from the floor. Do electronic transformers cause more staining? They shouldn't, if mercury migration isn't the culprit. Why do yellow tubes stain more than they used to? The advice (not an answer) given was to carefully pump yellow tubes, and protect them against moisture, preferably by keeping them sealed after coating. Some glass companies do this, but Bourque said "the labor cost became too high" for American companies to cork each tube like they used to twenty years ago. *<Editors' note: We just sent back a shipment of mostly UNbroken glass: the shards from a few broken pieces damaged the powder in each and every tube -- because they weren't capped. Maybe it's time for everyone to readopt this old standard, as Masonlite and TecnoLux now do.>*

Installation advice

Two seminars dealt with **installation**: a short session with advice from an installation expert from Young Electric Sign Co. (YESCO is one of the world's most famous sign companies, and made many of the Vegas spectaculars), and a marathon exposition of a new UL manual. When the latter session dragged on without giving any useful specifics, Ted left; others who stayed reported mostly tedium, but they got the book to take home with them...

Gary Hendricks, the YESCO guy, not only had a breathtaking video of a high-altitude repair atop the Vegas Hilton (complete with stories of attack by peregrine falcons nesting nearby), but he also gave some good common-sense advice on maintenance and installation:

"In hotter climates, extreme heat rises so the placement of transformers and ballast are critical in mounting them at the bottom of the sign. This ensures longer rated life, as you would expect in milder climates.

"Transformers should be mounted with the long side of the transformer firmly against the side of the transformer can. This allows heat to dissipate... Transformers left on 24 hours a day in hot attic locations may need bigger transformer cans or cooling fins added...

"...To help speed up your service troubleshooting time, individually fuse each of your ballasts or transformers with an in-line fuse. This enables part of the sign to light by taking out only the bad (section) rather than having the main breaker trip and keep tripping, thus having the whole sign go down. ...Don't be afraid to use used tested transformers for your maintenance contracts or leased signs.

"In wetter climates, use transformers sized with milliamp meter to ensure proper loading... Roof pitches are extremely important as to how rain runoff will affect any signage located directly beneath. Tile roofs in the Southwest are a particular problem with neon due to tunneled fast rain runoff.

"Other considerations include the location of your sign in reference to manmade environmental conditions. In the Southwest, (signs) in a lawn area will have to deal with daily watering by sprinklers along with alkaline deposits..."

Hendricks said 60ma transformers are good for cold weather, but not for brightness; he tells customers that dimness will correct itself when the sign is warmed up. He also suggested a 9,000-volt maximum transformer for use with Channelume letters.

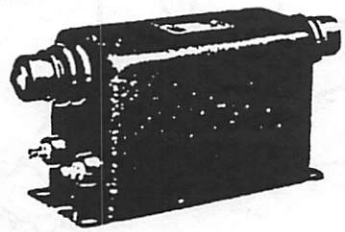
Hendricks made a startling comment on the economic importance of sign servicing during the current slump in new sign production: "Service during the boom times should be treated as an opportunity for extra profit. Service during the hard times will be the main support for your company." His company gives a 90-day warranty on new signs, and seeks a service contract after that.

Loose ends, the end

Other seminars included a tedious touchy-feely session on "Entrepreneurial Stress: When People Get You Down," and an exhausting presentation on estimating in which every nut, bolt and electrode cover was input for standard computer pricing (the program for sale cost hundreds of dollars, however).

The seminars on sign codes, permits and variances had some overlap, and a lot of heavy legal-political detail; we may decode and summarize these in our next issue...

Friends who took the **neon bus tour** on the last night said it was $23 well spent: not only a visual feast but also informative, as it was narrated by someone who had worked on many of the signs and knew the skinny about other companies' spectaculars too. We're sorry we missed it, but we were dozing at the airport, laden down with catalogs, samples, and a tired toddler. While waiting bleary-eyed at a ticket counter, Ted saw the unmistakable brick-like shape of a boxed outdoor-style transformer go by on the luggage carrousel, someone's take-home prize from the neon party... ◆



(1936 Jefferson transformer)

(Hannmann, from page 8)

of going it alone.

Self-employment held the best and the worst experiences for me in relation to what I was made of. I amazed myself with endurance and perseverance, and beat myself to an emotional bloody pulp for small mistakes, sometimes all in the same day. Self-employment was never boring; it was a roller-coaster ride from the get-go.

Bending can be (more) fun

Needless to say, life now as "just a bender" is much easier, more stable and, yes, sometimes boring. I sleep through the night, don't grind my teeth, and that knot of anxiety in my stomach is gone. I am enjoying a relatively stress-free life for the first time in my adult years, and I just turned 30! I don't think I needed to put myself through that wear and tear so early on.

Of course, that's all I ever knew, so it was only recently that I discovered how enjoyable just bending glass could be. Honestly, I was amazed. I started bending glass because I wanted to, but when I bought a business I bent glass because I HAD to. I couldn't stop or quit at any old time; I owned the place. "Professional pride" kept me going even when I wondered if I LIKED the whole occupation. But there were many days when the smell of the shop, the hiss of the crossfires and the sight of my schedule made me want to turn tail and run – preferably to the nearest bar for a drink! And from time to time, I did just that.

Owning a business is an occupation in and of itself. Making neon is a completely different business. Doing both requires a good head and good hands – and there's very little forgiveness on either side. It takes a lot of different skills to find the missing $243.59 in your checking account and to find the cause of darkening in a ruby red unit you've pumped four times.

I felt overwhelmed many times working for myself, and I have no easy answers for it even now. Two particular things I did often were: think of every day as a new beginning, and FORGIVE MYSELF!

The last was the hardest, and that's where your "support" comes in big-time. My friends, family, and my sign-shop-owning father in particular, guided me through many a tortured time. I could not have done it without them. The most important people in my life I consistently made time for, no matter how busy I got.

Against 'trade secrecy'

But the relationships I needed most – and did without – were with other benders. This is not just a problem for the one-man shop. It's industry-wide, and it is sad.

Now I'm hoping to help with the benders' group. I have nothing but time on my hands (wow!) and a glassbenders' organization is very much needed. Not only to foster camaraderie among us, and to teach, but to nip in the bud an attitude problem I've run into since being "out in the field."

I'd call it "trade secrecy." It's been with neon (as an industry) from the beginning. And although I didn't see it much when I was isolated from other benders, a friend says it's common. "Why?" I asked. "Well," she replied, "I guess they figure they learned it the hard way, so everyone else should too." Another bender added that it's competition, especially these days, that keeps secrecy alive and kickin': "If it comes down to layoffs, the fastest and best bender wins."

OK, I can almost understand that, though I don't like it. But this "learn the hard way" shit has gotta go.

There isn't a glassbender I've met who hasn't struggled in this trade. Every one of us has learned the hard way. Grueling hours, days, years spent singeing hair, burning skin, getting cut and all the rest, to finally produce our best work. It angers me a lot to think people aren't helping each other along. It's such a 1950s attitude, so out of date.

So I'm thinking of getting in touch with the Letterheads, to ask them how to start and keep a trade association going.

Unless, of course, they want us to learn "the hard way"! ♦

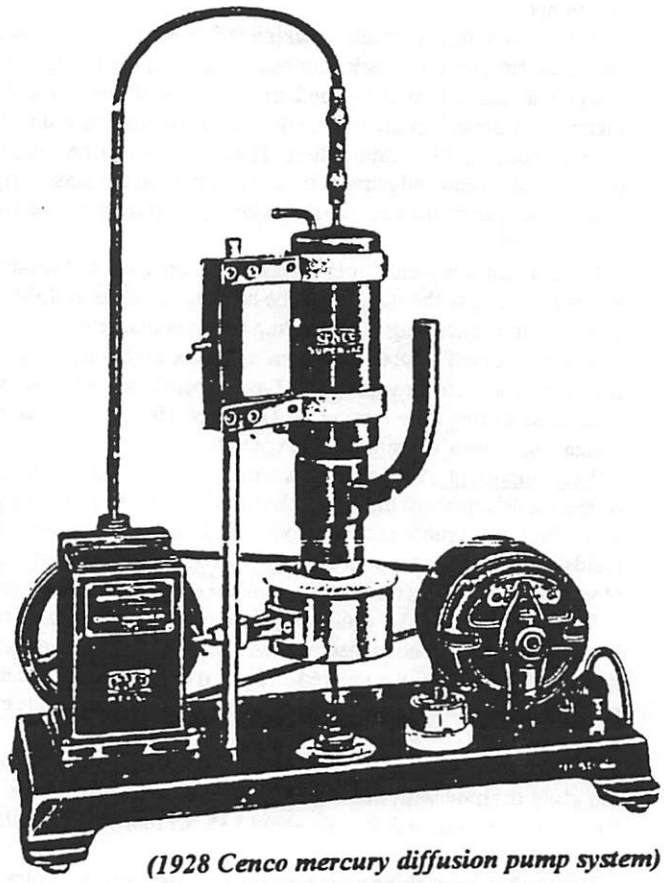
(Leybold, from page 14)

us his verdict, which he does on page 16. However, we apologize if readers are frustrated by contradictory technical information. We still feel neon people deserve to hear all sides of these issues, not just manufacturers' sales information.

<Personally, we still feel that a relatively inexpensive ($1,000-$2,000) high-vacuum system can be assembled around a diffusion pump for top-quality neon production. But we are also convinced that many American shops have a long way to go in incorporating the modern vacuum technology necessary for reliable results and long-lasting tubes. This debate raises the basic technical issues of pumping systems and standards, so even if one never shells out ten grand for a turbo system, we're all wiser for the discussion.

<Also please note that contrary to Felde's assumption, not all oil diffusion pump systems use nitrogen cold traps or are even water-cooled. For example, Neon Lewa of Scheveningen, Netherlands, whose reputation is outstanding, uses the small Edwards metal-bodied air-cooled oil diffusion pump, connected directly to the system. And they are very picky about quality.

<Perhaps Leybold or another party can back up the statement that ultraclean pumping "increases substantially the ... color brilliance of the finished tube" with statistics showing lumen output from tubes pumped on various systems. Then we'd be out of the realm of assertions and a little closer to scientific argument, with facts in hand and reproducible tests for anyone to challenge.> ♦



(1928 Cenco mercury diffusion pump system)

(Bolton, from page 15)

is by placing the mercury container on the "unit" end of the glass portion of the manifold, then he opens the main stopcock and uses the vacuum pull to fill the reservoir with mercury. I guess the entire shop if filled with vacuum pump oil and mercury vapors during the "filling" process (my friend steps outside until the vapors subside.)

When questioned, the guy says, "How else ya going to fill it?" JESUS!

I want to eliminate my competitors, but not by their self-destruction!

Hints

1) All of us have burned our fingers on our crossfires to achieve a bend or splice. To prevent this, cock both sides of your fires slightly off-center like this (exaggerated for illustration):

I rarely use electrode holders with my 7-point crossfires. To switch from left to right hand, either move 180° to the other side or don't tighten down your fires to the base (so you can swivel it easily).

2) When making a dead frame <a glass frame to attach neon to>, try this for making your last two splices:

On what will be the last splice, butt the open ends of the glass together and wrap with 1" masking tape. This seals off air without any corks being in the way, and holds the glass exactly where it needs to be. Make your next-to-the-last splice, let it cool if you want to, then pull off the tape and do the last splice. (This is a lot easier than the cork method, where you have to get the next-to-the-last splice done and then quickly remove the corks and get the glass to the pattern and positioned.)

3) If you are having trouble making 90° or double-back bends in your crossfire, try this: mark your bend, heat it in the crossfire until it's plastic, move to your ribbon burner (choked down to about 5-6 inches) and finish heating your double-back, rotating your unit 180° for even heat, until it's almost there. Then hold it so the heat is on the outside of the bend and pump it up and down, until the glass is right. Take it away from the fire, finish the bend, lay it on the pattern and "tune" it to fit.

No more muscle bends, your bends have more meat on the outside and it's faster! By the way, you'll be holding the glass at 45°-90° to your ribbon burner length, depending on glass diameter.

4) Get yourself a tube of Dupont's Krytox high-vacuum grease from Ace Glass Co. for your grease-type stopcocks as well as for your greaseless O-ring-type stopcocks. Good for 10^{-13} and contains no silicone so it won't "gather" any contaminants.

Very important: All you need is a tiny, tiny amount. For O-rings squeeze a dollop about the size of the tip of a dull lead pencil on your index finger and rub it between your thumb and index finger (clean hands!!), then apply it to your O-rings (3) that are attached to the plug of your stopcock. This much grease will do about six stopcock plugs.

You've done it right if your brown (viton) or black (buna) O-rings look shiny but have no grease residue showing. This eliminates O-rings from sliding off the tapered end and it allows the plug to move much easier when in use. You only need to apply it about once every six months.

On grease-type lead glass stopcocks -- apply the same way, until the glass is shiny with no excess grease left on. This stuff is very "slippery," and though it costs about $35 per tube retail it will last as long as you do.

Remember, everything must be squeaky-clean before you apply it.

5) To eliminate flashback through your manifold, for metal-manifold and/or direct-drive vacuum pump users, place a tubulated electrode (shell removed) between your manifold and the tube.

Ground the lead wires from the electrode via a switch, so you can turn the ground off and on as needed (a small knife switch is best). To remove the electrode shell, simply grab it with a pliers and twist back and forth until the wires break.

For those with glass manifolds using belt-driven pump and motor, remove both from the metal base, build a wooden box 6-8 inches tall and bolt pump and motor to the box. Make sure the pump is 3-4" away from the motor; build a lexan belt cover. Now your pump is isolated from any ground and can't flash back.

6) If you are using a pump that doesn't have a valve to prevent oil from sucking back into the manifold when turned off, you can buy an electric solenoid valve that shuts when you turn your pump off. Be sure to wire it into your pump switch. Boekel/Hyvac (1000 W. Washington St., Norristown PA 19801) carries these.

Do not use this on your belt-drive pump if you've isolated your pump against flashback -- you've put a ground back in. Use the one made by Kinney instead. (Kinney Vacuum Co., 495 Turnpike St, Canton MA 02021; 617-828-9500. They make good vacuum pumps too.) It operates mechanically -- when the oil rises out of the pump into the valve, it floats a ball into a viton rubber seat. It's bulkier than the electric one but works like a champ.

7) To avoid getting a severe shock because you've accidentally left your burn-in transformer on and you grab a clip to hook it up, get in the habit of lightly "smacking" it with the back of your hand first. (This way, if it's on you only get a light tingling sensation; the other way your muscles contract, gripping it harder into the "can't let go" mode and possible bad shock.)

8) In cold weather, I put a 3-foot-long electric heater about four inches below the underside of my bending table. It heats the 3/4" plywood table and non-bestos cover up to 80° -- eliminates cracks and splits due to thermal shock from hot glass on a cold surface.

9) Most of you have a perfect annealing flame and should use it on every splice and bend, especially those bends that are close together: it's your ribbon burner in "idle" or gas-saver position.

10) We all know TecnoLux is the greatest thing that has happened to colored glass, but it still must be bent, treated and processed differently from lead glass or you'll continue to have cracks, splits and field returns.

I do hundreds and hundreds of feet of this stuff every year and we have very few problems -- about the same percentage as lead glass. If you're having trouble with classic glass (any brand), call me and I'll tell you the methods we've developed over the years that will drastically reduce your problems.

11) An agent of Teledyne-Hastings informed me that a thermocouple gauge has an average life expectancy of about one year (any manufacturer). It seems the tiny pure gold crosshairs, which measure the amount of molecules passing by them with the vibration then transfered electronically, get contaminated with impurities and cannot function properly.

He says if your gauge tube goes bad that's probably the reason, unless you've zapped it with a flashback. You can rectify this problem by removing it, putting a small amount of analytical reagent-grade acetone in it, swish it gently back and forth to remove impurities, dry and reinstall it. I haven't tried this yet, as mine works fine, but if you've got a wasted one laying around give it a shot -- you might save $100-$125 for a new one. Let me know the results. ♦

Nightmare contract clauses

Take a hard look at the underlined phrasings below; they indicate legal trouble, according to sign company attorney Neil Smith:

"Subcontractor (Seller) hereby indemnifies and holds Contractor and Owner harmless from any and all claims, loss, damage, liability, costs, charges or expenses directly or indirectly arising out of this subcontract Agreement which may be caused, or claim to be caused, by the negligence, either active or passive, of either Subcontractor, Owner or Contractor and their respective officers, agents, and employees, or the concurrent negligence of Subcontractor, Owner or Contractor, or for which any one or all of them may be liable." ***<This clause sets you up for TOTAL LIABILITY in case of any problem with the whole project, no matter who's at fault.>***

"The Subcontractor shall not raise as a defense to its obligation to indemnify under this paragraph any contributing negligence of any of those indemnified hereunder. It being understood and agreed that no such contributing negligence shall relieve the Contractor from its liability to so indemnify nor entitle the Contractor to any contribution, either directly or indirectly, by those indemnified hereunder." ***<In other words, no matter who screws up, you'll take the rap.>***

"The subcontractor shall indemnify, save harmless and defend the General Contractor and Owner (and, when applicable, their parent and/or affiliated companies or subsidiaries) and their prospective officers, employees and agents against any and all claims, demands, causes of action, suits or other litigation (including all costs thereof and attorney's fees) arising out of or associated with the performance of the work..."

Watch out for lien waivers, "indemnify and hold harmless" clauses, and wording which subjects you as subcontractor to all of the "prime contract" between the owner and general contractor.

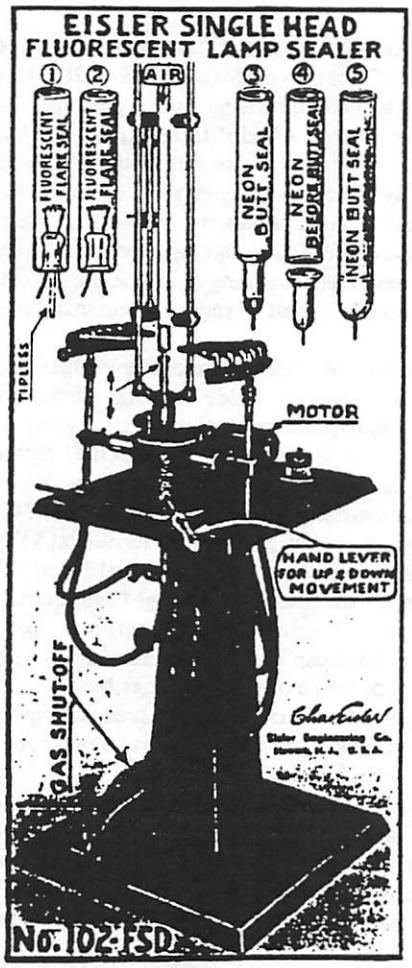
"Sub-subcontractor, or anyone acting under Subcontractor's direction or control or on its behalf, including to the fullest extent permitted by law, the active or passive negligence of the indemnitee and such rights to indemnification shall apply regardless of whether any act, omission, misconduct, negligence, or default (other than gross negligence or willful misconduct) of the Contractor or Architect or any employee of either contributed or may be alleged to have contributed in any way thereto provided, however that the Subcontractor shall not be liable under the provisions of the paragraph for any liability arising by reason of the sole negligence of the contractor and/or its respective employees." ***<Smith called this "accepting only ninety percent of the blame" for anything that goes wrong on the project.>***

Subcontractor shall indemnify Contractor and/or Owner against, and save each harmless from: "... (2) any and all loss, damage, injury, liability and claims thereof for injuries to or death of persons and all loss of or damage to property resulting directly or indirectly from Subcontractor's performance of this Agreement, regardless of the negligence of Owner or Contractor or their agents or employees; provided that where such loss, damage, injury, liability or claims are the result of active negligence on the part of Owner or Contractor or their respective agents or employees, and is not caused or contributed to by an omission to perform some duty also imposed on Subcontractor, its agents or employees, such indemnity shall not apply to such party guilty of such active negligence unless the prime contract documents otherwise provide; ..." ***<This and the following examples make the subcontractor subject to other contracts and documents.>***

"The work called for shall be in accordance with the terms and conditions of this Subcontract Agreement, expressly including the provisions printed on the reverse side, along with all applicable requirements of the Prime Contract (hereinafter called the "Work") between the Owner and the Contractor."

"The subcontractor assumes toward the Contractor all the obligations and responsibilities that the Contractor assumed toward the Owner, as set forth in the Contract, General and Special Conditions, Drawings, Specifications and other documents hereinafter referred to."

"... in accordance with the terms and conditions of the Contract between the Owner and the Contractor dated _____, including all the General and Special Conditions, Drawings and Specifications and addenda and other documents forming or by reference made a part of the Contract between the contractor and the Owner, all of which are hereby made a part of this Subcontract." ♦



(from 1948 Eisler catalog)

(Bulletin Board, from page 28)

shops that use computers to design and do layouts. He wants basic info on equipment and software that will work for the small custom shop.

Martin Anderson of Cloverdale OR wrote to describe a **radio-TV interference problem** he had with a transformer: "On one unit, when I installed it at a gallery for a show, I heard it humming more than usual but it lighted the tubes and I had a lot of other works to hook up so I left it. About a week later the electric utility company guy knocked at the door of the gallery with his field meter. He said he had been looking for the interference problem for about five days (and was angry) after lots of customer calls. Anyway I replaced it with a different ND 3707b and no problems... Neon Dynamics gladly replaced it."

And, in an "artist's statement" for a show of his, this fine line: "There are probably more ways of doing art than there are of being neurotic."

Some comments and questions from Glenn Karich of Bright Idea Neon Co. (Embarrass MN, no joke): "I'd like to know where to get a good **pyrometer with glass clip**. My old magnetic ductwork thermometer is getting tired. Have any reports come in of people using the digital thermometers that you just aim at the glass?

"I would like to use solid-state transformers, without enclosures, above suspended ceilings, and plug them into outlets there, but the inspector believes that such an installation must be fully visible. I wonder if one could mount solid-states above a suspended ceiling without enclosures and hard-wire them?

"I'm having a mercury test done, just for curiosity. It required a one-gallon urine sample!

"I think changing pumping pressures as recommended by Neon Dynamics is B.S.; Allanson's neo-tronics recommends conventional pumping."

<Editors' note: It was pointed out by one frustrated wholesale bender at a NESA seminar that it's gotten to the point where he can't keep track of what pressure to provide for which client, as different (solid-state) transformer manufacturers specify different filling pressures. The panel's response: fill them to normal pressure and don't let manufacturers dictate special procedures!>

A gallery opportunity: "Please send videos of neon art works to be shown at the North Miami Center of Contemporary Art, Sept. 9-Oct. 16. Send to Dorothy Bosco, curator, 6350 SW 106 St., Miami FL 33156; (305) 665-2540. Include resume, and self-addressed stamped envelope if you want video returned."

A viewing opportunity: Amuze Gallery in Santa Fe NM will showcase neon art in a group exhibit, "Into the Light," August 15-31, with a reception August 20. Go and meet some new folks... like Maureen Harvey of Studio One Neon, who specializes in helping Santa Fe artists use neon.

She has a query: "I'm looking for info on pumping short tubes (18" or smaller). In the past, I have had tubes come back for replacement that had "burned out"; they were mostly neon units, but I think at least one short mercury tube also was out. I am assuming the gas was absorbed by the electrodes.

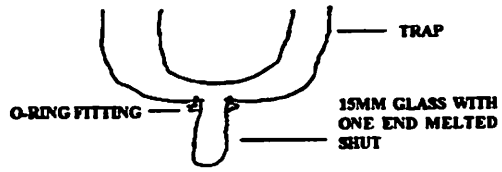
"Frank Montroy addressed this problem by suggesting we add 1mm torr gas for every foot of tube under ten feet. This seems a little overkill to me– although I haven't experienced any more problems yet by using this overfilling method. Any comments?"

Oops: In Neon News #3 Ted mentioned mixing neon and argon to create a brighter purple tube.

Uh, turns out these'll turn over to neon-red color after five years, which was a surprise to the client who found her living room bright red one day...

Looking for **large-diameter glass**? Roger Daniells at Ad Art in Stockton CA (209-931-0860), has cases of 18-25mm coated tubes, including green, blue, turquoise, neo-blue, clear gold, various whites and even some lenslite (uncoated on the front third of the tube). At prices around $1/pound they're just trying to clear it out of there.

Signs of the Times is conducting a survey and assembling a database on **women in neon**; to get a copy of the survey or to pass on a name, contact Lori Jareo at (513) 421-2050 (fax 513-421-5144). Deadline is July 30, though late is probably better than never.



Mike Cole, Cold Cathode Creations, Tempe AZ, writes "Want to **wash mercury down the sink**? No problemo! A simple compression fitting screwed into your drain trap catches it all and is easy to clean:"

Having seen a fair amount of huckster literature about learning neon and all the bazillions of dollars to be made therein, we found the brochure from the **National Neon Institute** in Benicia CA quite refreshing. The school's approach is very straightforward, with emphasis on what the physical task is all about, particularly so that handicapped folks can see if they should consider a bending career (how much standing, how much lifting, etc.). Contact Lee Champagne, (707) 747-6167.

For a school of a different sort, in the art glass world there is only one Pilchuck Glass School (Stanwood WA.; 206-445-3111; fax 206-445-5515), and one of this summer's sessions (Aug. 15-Sept. 1) includes the course **"Makin' things that glow"** with artist Cork Marcheschi. From the course description: "Traditional bending, pumping, and filling techniques will be taught, as well as all the electrical information necessary." However, "This class is not for anyone who is interested in learning to be a sign bender." It's too late to register, but consider getting on the mailing list if total immersion in art glass could be part of your next summer's plans.

Ted here: Maybe I'm the last one to figure this out, but it is possible to **rebuild old glass electrode housings**, should you want to save some bucks and not toss perfectly good glass away. Mainly what you need are new springs and metal ferrules (the "ferrule" is the metal threaded part on the outside). While they don't sell any other components separately, Standard Neo-Lite (516-242-1700; fax 516-242-7913) will sell you replacement ferrules at $17 per hundred for the size that fits #200 housings. They'll sell directly if your distributor doesn't stock them. For springs, Hage Connectors, (707-745-8369; fax 707-745-9432) sells them at 28 cents each, also selling direct if your distributor doesn't stock them. The Hage spring isn't identical to original-type springs in #200 housings, but with slight modification they work just fine. Which leaves the threaded components – they are usually not corroded, but if anyone has sources for these and other housing "parts" please let me know.

Also: One Christmas about 10 years ago I received a **'tapeless measure,'** a map-wheel-like device with a removable handle whose intended purpose in life is to measure rooms, etc., without bending over. While made of plastic and not particularly sturdy, I find it extremely handy (sans handle) for map-wheel-like tasks, because it

(see More bull, page 27)

(Ruby, from page 3)

So I'm sitting on tubing that I can't use. I'm not alone – I know there's probably a lot of other people with this problem...

Brown: Yeah, well, that's called "shame on us." *<laughter>* I think if you listen to all the panelists' answers. I'm not sure that what I'll call my "mother's recipe" is necessarily sufficient for a technical bulletin to go with the tubes. ...To answer, "Why haven't you published it?" ...At this point it's an anecdotal experience; we've only had three or four cases where it's been used and seems to work. Is that sufficient to issue a bulletin? I'm not sure as a manufacturer that that's enough. There are some further tests that we're doing, just like they <other manufacturers> are doing, trying to figure out what <to do>. Their solution may be totally different than mine. The best I can give you is this is something that works; I can't explain why it works, and manufacturers typically will not do that unless they know why. So that's the best answer I can give you.

Question: Is that ordinary tap water?

Brown: Yes, ordinary tap water, in all cases they used tap water... (But) distilled or deionized water is even better...

Question: I assume when you say "ammonia," that you mean a dilution of pure ammonia...

Brown: We're talking about ammonia you go to the grocery store and buy.

Question: Are there any shops that don't have problems with ruby red? Perhaps they'd like to share why they think they don't.

*<Inaudible comment, paraphrased by **Brown**:>* You found that if you kept the units short, if you did what I think most of us call a pre-heat, to heat the glass, you evacuate and bombard it again... You use ceramic-collar electrodes... and you did not overheat the glass... *<Another bender from the floor endorsed these steps, and advocated a helium rinse too.>*

Ruby red problems are a hot topic far beyond NESA, and **Joseph Keller** passed on this advice:

"When working with classic glass, especially ruby red uncoated, I understand that slow cooling helps the pumps alleviate a greater amount of the impurities. One cheap and effective way you may want to try is to use fiberglass batting, otherwise known as spun glass insulation. Get the kind with the paper on the back for ease of handling.

"Lay the tube on a piece of insulation and tubulate to the manifold. Then simply cover the tube with another piece, making sure you can poke at least one electrode out where you can see when it cherrys. This will hold in the heat longer to allow more impurities to be liberated, therefore making a cleaner tube."

*<**Ted here**: Great minds think alike: elsewhere in this issue Edward DeZuzio proposes using Nonbestos on clear tubing for similar reasons.*

<I had a chance to try the fiberglass technique the other day, and was very impressed: fully twenty minutes after pumping, the tubes were still too hot to touch! Handling the fiberglass is a drag, of course: I used lightweight rubber gloves to keep the itchies away. The smell from the hot glass on the fiberglass isn't much fun either, though it's not overwhelming. Also, I chickened out and left the top "blanket" off until after bombing: didn't want any surprise hot spots sucking-in the glass. Time will tell if the tubes stay red...> ♦

(More bull, from page 26)

has a digital output and counts up to 100 feet; no more interpreting, adding or remeasuring. Other than "ENM TAPELESS MEASURE" on the side, there's no manufacturer's data. Anyone have a source?

Karl X. Hauser, when not running around wearing neon bones and fish and hammers, is curious (and rather peeved) about **where the term "tubebender" originated.** He said that when he started, uh, hot tubular glass work 15 years ago he was called a "neon glassblower" and he still uses that term, as he feels it has a bit more dignity.

Another ear-irritant: Just when you thought the word "neon" would disappear from overuse, Chrysler gives us the **Dodge and Plymouth Neon.** The Wall Street Journal explained: "The easy-to-remember name is intended to give the car a bright, lively, young feel..." Honestly. I suppose it's for really driving gas around the bends (a la Michael Blazek's article). Terry Schmidt of Hopkins MN asked his local dealer, "I suppose it only runs on H-gas?"

(Some other personal experiences with the word: Val was asked if the "Volcano Neon" on her checkbook was her name – after all, there are a lot of old hippies living on this island... and Ted was asked by a store clerk if Volcano Neon was a line of clothing for kids...)

Is it classic or is it dip? Only your bombarder knows for sure. Eileen Ramono told a story of someone accepting a ruby-red repair for $35, the "golden gate bridge" on a beer-type sign, only to find out that it was clear glass, dipped red, and had to be completely remade in real ruby red (ouch!) as the dip solution burns right off. *<Ted was saved a similar fate when handed a broken "Corona" beer sign in Amsterdam – he'd not seen one before and a visiting tubebender pointed out the yellow dip on 6500-white glass.>*

From Candice King in Amsterdam, a new neon market: the hospital room. Her Neon Workshop colleagues "made a little neon heart powered by a Tech 2000 on a 9-volt battery to hang on my hospital bed. I had a pull-up bar so I stuck the transformer to the bar with sticky tape and hung the heart by a ribbon. I think we pioneered the **first mobile neon hospital bed.** It sure cheered me up."

Also, "a good tip from my physical therapist for people who have to stand a lot: put your foot up on a low block when you're standing. It causes you to tilt your pelvis into a better position for your lower back. (Oh, yeah: alternate feet.)"

Candice had some mean back problems, but her post-surgical progress looks good so far. Unfortunately, the prognosis for the Neon Workshop is a bit shakier, and the expatriate benders there (three Yanks and a Brit) are exploring other options. They're all good folks and great benders, with European tricks and techniques to pass on. Anyone have a job lead to share? Maybe they'll thank you with some cheese, or some other famous Amsterdam export...

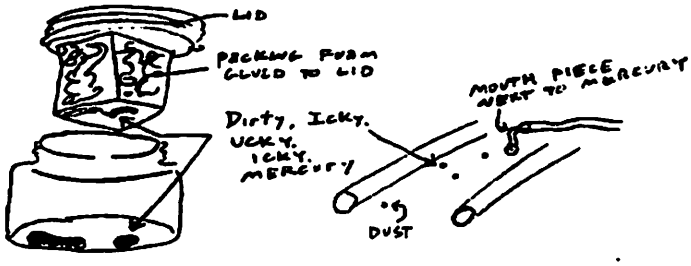
When in San Diego check out "The Grove Gas & Light Company," UCSD's neon art facilities. They won our **most-stylish-neon-coffee-mug award** for a generous cup all decked out (in ceramic decals) with electrodes and tranformers and gas flasks oh my. They're produced in limited runs for underpaid teaching assistants, and sadly not for sale...

Marty King of Light'n Up Neon (Washington DC) hoped that "any neon karaoke marathon" (which never did materialize at Vegas, much to the chagrin of a bender who came solely for it) "will include the immortal words sung by George Jones – "I don't need a rocking chair, Geritol, or your Medicare – 'cause I got neon in my veins!" ♦

BULLETIN BOARD

Rob Jacklin of Luminescense (Sausalito CA) wants information on **transformers that fade (on purpose) and/or chase.** *<Editors' note: We know of none on the U.S. market. Diversified Components used to distribute the NEB-5 Blossomlite plug-in auto-fader; when we called them they said they had seven or eight left, returned from distributors, and would sell them for $70 each. Call them at (409) 597-5988, fax -6044>.* Daniel Dezort also wants sources/info for flashers and chasers: "Wiring, prices, mechanical versus electronic and such." *<Anyone want to tackle this? We'd welcome a story...>*

Michael Barsotti of Neon & On (Lawrence KS): "Regarding **mercury collection**, I got this idea from an OSHA man: Get a small section of dense foam, the same kind the glass companies use to pack color sample packs with. Glue a small section to the underside of a baby food jar lid. Press foam with lid onto fallen mercury, return lid to jar. Tap jar on table and mercury will fall out of foam into jar. When enough has collected, call local EPA for proper disposal.



<Ted has an EPA story: When working at a Honolulu sign company, I decided to call around for proper disposal of four gallons of old pump oil, presumably mercury-contaminated. EPA informed me that with a quantity under six gallons I wasn't obligated by law to dispose of it in any special way, but they appreciated my interest and effort and referred me to a local hazardous-waste firm. This company in turn had me talk to a specialist, who phoned back a week later explaining that since there were no proper facilities in Hawaii, the oil would have to be transported to the mainland and dealt with there, transported of course as "hazardous waste" and with a total bill of over $1,000. Needless to say, that didn't happen.>

Ed McAllister of Neonwerkes (Allston MA) notes: "In **photographing neon**, try to leave the lens open longer (not automatic exposure), for a time exposure, bulb-tripod shot. This is a technique that only works at night, however, other light pollution will affect the outcome."

Dr. Argon has two queries: "Why does my **manometer gas fill gauge bubble** like a coffee percolator while I'm filling units? This doesn't happen all the time but it comes in for a visit every now and again. I know my manifold is tight – where are the bubbles coming from? Are they somehow extracted from the butyl oil? Does it have anything to do with the moon?

"Also – what does it mean and why and how do I fix it (good name for a column) when the gas surrounding the electrode still is luminous, sometimes flickering, sometimes not, and most often in neon-filled units? It usually goes away with aging. I always cook my shells more than al dente. I don't know the answer to this..."

Larry Kanter of Neon Projects (Washington DC; 202-635-6366; fax 202-529-7895) would like to see articles and information on glass

(see Bulletin Board, page 26)

ADS

English lead glass bender with soda glass experience, looking for employment, will condider any options. Fax 011-44-481-823104, or contact c/o Neon News.

For sale: 2 Hyde ribbon burners with economizers, 24" heads, $325 each. 5 Hyde crossfires, 5 points with stands, $300 each. All new in boxes. Call Neon Design: (803) 781-4523.

Neo-vac stainless steel vacuum systems. Triple-stage diffusion pump, pirani gauge, digital backfill gauge, bellows sealed/packless high-vacuum Nupro valves, fast-clean mercury/debris trap. The best, most reliable neon vacuum system available; (510) 654-9830.

Equipment for sale, new and used: Crossfires, cannonfires, ribbonfires, hand torches, bombarders, chokes, pumps, manifolds, complete tube plants ready to work. No money down, financing available! Victory Sign Equipment (manufacturers of fine neon equipment): (815) 476-4173.

Colorful neon postcards: Pontiac Indian, Hojo's lamplighter, Buster Brown, etc. 15 assorted, $8.50; 50 cards, $13.50. Davidson, 860 N. 26 St., Philadelphia, PA 19130; (215) 232-0478.

Tubebender, 16 years experience including lab glass, seeks employment; looking for a quality-oriented custom shop. Write c/o Neon News.

Rare glass for sale. Voltarc "Candystripe" glass, 15mm. 34 sticks Neoblue/white; 15 sticks Neoruby/white. Whole lot $500.00, O.B.O., FOB Washington, DC. Larry Kanter 202-635-6366.

THE NEON NEWS

THE NEON NEWS, P.O. BOX 668
VOLCANO, HAWAII, 96785
(808) 967-7648